



THE UNIVERSITY OF
MELBOURNE



Economics Legislation Committee Inquiry

Medicare Levy Amendment (National Disability Insurance Scheme Funding) Bill 2017 and 10 related bills

(Abolition of the Education Investment Fund)

8 September 2017

Executive Summary

The University welcomes the opportunity to outline to the Senate Economics Legislation Committee our deep concern at the abolition of the Education Investment Fund (EIF). The Fund has made a significant impact on improving teaching, learning and research infrastructure across the nation that is having a profound impact on the economic and social wellbeing of Australians.

The *Nation-building Funds Repeal (National Disability Insurance Scheme Funding) Bill 2017* provides for the repeal of the *Nation-building Funds Act 2008*. Uncommitted funds from the Building Australia Fund and the Education Investment Fund will subsequently be credited to the National Disability Insurance Scheme Savings Fund Special Account when it is established.

While the NDIS must be properly and sustainably funded, it is short sighted to do so at the expense of the nation's teaching and research effort. Since 2011, universities have suffered \$3.9 billion in cuts to commonwealth funding. The government's current proposals in the 2017-18 Budget would remove a further \$2.8 billion of direct commonwealth funding from universities. A pattern of federal disinvestment is clear.

In this submission, we emphasise the criticality of identifying an alternative source of funding to ensure the objectives envisaged for the Education Investment Fund can continue to be achieved.

EIF has assisted Universities to update teaching facilities and invest in infrastructure that is delivering on the national innovation and science agenda. Universities too are engaging in a wider range of project financing structures to deliver infrastructure that they could not otherwise afford. This includes partnering with the private sector in PPP/BOOT-type structures, public funding, philanthropy and debt.

EIF has also supported research infrastructure that is too expensive for a single institution to take on and it has created collaborative engagement across numerous partners including universities, public research bodies and industry. In several cases EIF has supported the development of emerging capabilities and/or addressed gaps in capability that has subsequently put Australia at the cutting edge of the research frontier, for example in health, urban planning, brain science, infectious diseases and microbial resistance.

EIF has also successfully leveraged other sources of funding to multiply resources from partners and others who by themselves, could not afford the scale of investment.

The importance to the national innovation agenda of a sustained federal government commitment to both capital and operational funding of research infrastructure is well documented. Several recent reviews, including the *Research Infrastructure Review* and the *University Infrastructure Review* draw unambiguous conclusions that government has an essential role to play in making nation building investments in Australia's research effort. They conclude that there is a clear need to develop a long-term plan to provide adequate funding for transformative institutional research infrastructure and teaching facilities.

Abolishing EIF and removing \$3.7bn earmarked for transformative institutional research infrastructure and teaching facilities will diminish the nation's research effort, impede research translation and commercialisation and short change the generations to come.

For further information or to discuss this submission please contact Dr Julie Wells, Vice-Principal Policy & Projects, on julie.wells@unimelb.edu.au or (03) 8344 2639.

World-leading, strategically focused infrastructure

EIF was funded to support world-leading, strategically-focused infrastructure investments that would transform Australian tertiary education and research. The flow-on effects have contributed to the important work of cultivating an internationally competitive Australian economy.

The Government's Higher Education Infrastructure Working Group (HEIWG) examined how universities support their teaching and research infrastructure requirements. The Group's report found:

“With the loss of the Higher Education Endowment Fund (HEEF) and the Education Investment Fund (EIF), established to assist universities to build world class transformative facilities, we have lost something which was designed to take our institutions to another level.

The leveraging effect of the HEEF and EIF was also very significant. The funding provided by the Government attracted significant co-investment, stimulated the economy and created jobs, and resulted in some outstanding infrastructure outcomes. HEEF/EIF matched or bettered many infrastructure funding schemes for universities in countries Australia benchmarks against and competes with in the international higher education market.

The question needs to be asked why government no longer believes it has any role to play in this form of nation building.” (p viii)

Universities are challenged by the capital procurement requirements of a contemporary higher education learning environment. For some disciplines, core infrastructure is a component of the requirement to be accredited to offer some courses of education leading to a professional qualification. Reported financial results for universities generally mask low underlying operating margins. For example, the University of Melbourne's underlying operating margin has been as follows:

University of Melbourne Underlying Operating Margin 2012-2016

	2012 \$m	2013 \$m	2014 \$m	2015 \$m	2016 Actual
Underlying operating margin	(0.3)%	0.4%	0.3%	1.9%	3.1%

And the University's finances continue to experience a declining proportion of government to non-government funding:

University of Melbourne proportion of government and non-government income 2012-2016

	2012	2013	2014	2015	2016	CAGR 2012-2016
YoY Growth %						
Government Income	11.5%	(7.5%)	(0.6%)	(2.9%)	(1.3%)	(3.1%)
Non Government Income	6.0%	10.2%	24.9%	0.6%	10.5%	11.2%

As a result, the University has pursued a number of innovative financing structures to deliver infrastructure that it could not otherwise afford. This includes partnering with the private sector in PPP/BOOT-type structures, public funding, philanthropy and also debt via US bond raisings. Examples of the University’s approach to funding infrastructure follow.

Carlton Connect Initiative

Total project cost	▪ c. A\$500 million
Funding source	▪ PPP
Expected completion	▪ 2020-2021

Western Edge Biosciences Zone Stage 1

Total project cost	▪ c. A\$160 million
Funding source	▪ Internal
Expected completion	▪ 2019

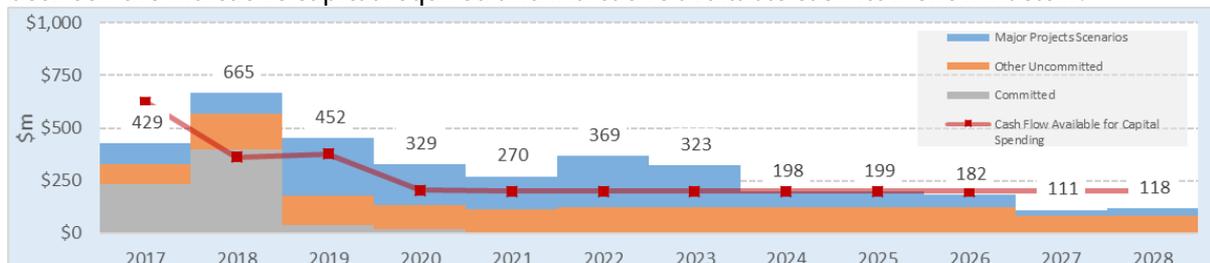
Bio21 Stage 2

Total project cost	▪ c. A\$36 million
Funding source	▪ Debt
Expected completion	▪ 2017

Melbourne Conservatorium of Music

Total project cost	▪ c. A\$105 million
Funding source	▪ Internal, Philanthropy & Government
Expected completion	▪ 2019

Significant infrastructure projects are required to stay globally competitive. However, there is a gap between the indicative capital required and indicative available cash flow shown below:



The Higher Education Infrastructure Working Group found that:

“... the most relevant point of engagement for universities with the capital markets is likely to be the Debt Capital Markets (DCM) that provide borrowings in the form of bank debt and bonds ... There are circumstances where gearing development or purchase of infrastructure through debt financing is clearly in the best strategic interests of an institution.” (p vi)

However federal government funding uncertainty exacerbates universities’ consideration of funding mission critical infrastructure:

“An apparent low risk appetite among universities appears to be amplified at present by regulatory and funding uncertainty. It may be argued that all enterprises must operate

and make decisions in the light of uncertainty. However, universities cannot control the tap that increases or decreases the flow of base funding for domestic students, the largest single income source for the sector. So it is not surprising in light of the changes and mooted changes over the last decade that they have paid down debt, as they did in the 2011-2013 triennium, and are anxious about how much more they borrow.” (p vii)

While philanthropy can diversify funding sources, it is typically project-specific and is but one ad hoc funding stream:

“Philanthropy can assist in small part in provision of funds for university infrastructure. There is capacity to build philanthropic giving to universities but it is not a silver bullet for university infrastructure funding.” (p vii)

However, building public infrastructure is a nation building activity and government has a role to play including assisting universities to leverage the value and return on these investments. University infrastructure provides social and economic returns to communities. For example, it is estimated that the Melbourne School of Engineering second campus under development will return some \$400m to State Domestic Product.

The Higher Education Infrastructure Working Group recommended that the Australian Government:

- i. conduct a detailed analysis of the economic impact and other outcomes for the nation and for universities of HEEF and EIF investments; and
- ii. based on the analysis, develop a long-term plan to provide adequate funding for transformative institutional research infrastructure and teaching facilities, with co-investment and collaboration as prerequisites.”

While the NCRIS Roadmap has been welcomed by the sector, government investment is still not committed to deliver it. Further, EIF funded across a wider remit than research infrastructure, including essential modern facilities to enhance teaching and learning.

The importance to the national innovation agenda of a sustained federal government commitment to both capital and operational funding of research infrastructure is well documented.

The National Commission of Audit¹ found that:

Research infrastructure is a critical component of Australia’s research system ... However, there is currently a lack of certainty around funding for research infrastructure beyond 2014-15.

Without ongoing funding, established facilities will not deliver their maximum benefit to the research community and much of the value of the initial investment will be lost. Should established facilities be required to close, the cost of re-establishment would be significantly more than that required for their ongoing operation and maintenance. The Government should make a commitment to ongoing funding for critical research infrastructure in Australia. This could be informed by a review of existing research infrastructure provision and requirements.

¹ *Towards Responsible Government*, National Commission of Audit (Appendices, Volume 2, p32), February 2014. <http://www.ncoa.gov.au/report/>

The Government-commissioned Research Infrastructure Review, chaired by Philip Marcus Clark,² noted that several leading international economies have recognised that quality research must be supported by quality infrastructure and highlighted benefits from research infrastructure investment such as boosting productivity by innovation, and growing the nation’s human capital. That report identified the responsibility of the Government in providing essential infrastructure:

“Providing essential infrastructure for Australian researchers is primarily the responsibility of the Government. There is no precedent anywhere in the world to suggest that industry, state and territory governments or not-for-profit agencies would accept sole responsibility if the Government stepped away.

Public investment is necessary to provide the ‘truly patient’ capital needed to create an *environment for the inspired risk taking that is essential to technological discovery*. Only governments have the capacity to invest this patient capital into the long timeframes that must apply to research and to research infrastructure.” (p12)

The theme of sustained capital investment is also an important message in the Issues Paper released by the National Research Infrastructure Roadmap Expert Working Group³ chaired by the Chief Scientist, Alan Finkel:

“3.7 Funding for research infrastructure

Research infrastructure represents large financial investments, both in initial capital investment and in operational costs. The role of Government is as key investor with patient capital that will, over long timeframes, achieve significant returns on investment and spill-over benefits. Historically, Australian national research infrastructure investment has been made through Australian Government grants, supported by significant co-investment by state and territory governments, universities and the private sector. “(p10)

The abolition of EIF is contrary to this sustained and consistent advice to Government from the nation’s leading scientific advisers, including two Chief Scientists.

² *Research Infrastructure Review Final Report*, September 2015 (p12) <https://www.education.gov.au/research-infrastructure-review>

³ July 2016 “National Research Infrastructure Capability Issues Paper” from the National Research Infrastructure Roadmap Expert Working Group chaired by the Chief Scientist, Alan Finkel, https://docs.education.gov.au/system/files/doc/other/2016_national_research_infrastructure_capability_issues_paper.pdf

Impact of the Education Investment Fund

The University of Melbourne, as a major participant in the national research and innovation system, has been deeply involved in EIF investments over the past decade.

Key impacts from Government research infrastructure investment through EIF that we see very directly include:

- Creating the environment for larger scale, cross institutional research collaborations by provisioning of infrastructure that is greater in scale than individual institutions, or even small groups of institutions could bring.
- Catalysing novel team research through access to national capabilities that are supported by governance and operating mechanisms ensuring a truly national approach is achieved with efficient modes of engagement from institutions and research groups.
- Sustaining the specialised workforces that are essential for the effective operation of complex facilities, directly through provision of operating funds, and in partnership with institutions who provide complementary training and career development opportunities.
- Facilitating Australian Universities to lead on, or participate in, international research collaborations focused on solving global problems.

Examples of EIF funded projects which involve the University of Melbourne include:

The Peter Doherty Institute for Infection and Immunity

The most significant single investment entrusted to the University was the \$90m contribution to the establishment of the Peter Doherty Institute (PDI) as a \$210 million partnership between the University of Melbourne and Melbourne Health, funded by the Commonwealth Government Education Investment Fund and the Victorian Government. The Institute is named after Peter Doherty, an Australian scientist who won the Nobel Prize in 1996.

PDI is a world leading facility combining research, teaching, public health and reference laboratory services, diagnostic services and clinical care in infectious diseases and immunity. This includes discovery research; diagnosis, surveillance and investigation of infectious disease outbreaks; and the development of ways to prevent, treat and eliminate infectious diseases. Scientists and clinicians, among 700 staff at the Doherty, are developing the most effective treatments in infectious disease immunity and will deliver breakthroughs in cutting-edge advances and treatments to all Australians. Such a facility providing a pathway from basic science to clinical trials and then to patient care could not have been achieved without EIF investment. <http://www.doherty.edu.au/about/overview/>

Centre for Neural Engineering (CfNE)

The CfNE works on the great challenges of the neurosciences to increase our understanding of neuronal and brain functioning. The Centre's research has application to repairing vision and hearing, as well providing novel treatments for epilepsy, Parkinson's disease, spinal injuries and psychiatric disorders such as Autism Spectrum Disorder (ASD).⁴

University of Melbourne funding was complemented by investment of \$17.5m from EIF, which provided critical computational resources that enabled the creation in 2011 of the Centre for Neural Engineering (CfNE). This is an interdisciplinary centre, drawing together leading neuroscientists, neurologists, psychiatrists, cell biologists, geneticists, electrophysicists, chemists, physicists and engineers from the University of Melbourne and partner institutions including: Florey Neuroscience Institutes, NICTA, Bionic Vision Australia, Bionics Institute, Melbourne Brain Centre, Royal Melbourne Hospital, Austin Health, St Vincent's Hospital and other Australian and overseas partner universities and industry. As part of the establishment of the CfNE, the University of Melbourne received \$14 million in EIF support to expand the Parkville data centre facility. To complement the establishment of the Victorian Life Sciences Computation Initiative and the Peak Computing Facility, the second data hall provides the capacity for the University to expand the use of high density equipment on campus which is expanding Research Computing.

The scale of dedicated computational resource essential for constructing and testing the necessary models would not have been possible without this investment, and the availability of that facility has enabled the bringing together of a critical cluster of leading researchers, and the training of the next generation of graduate research students.

As one example of international leading research, within the Epilepsy theme of the Centre's research, scientists and engineers are developing technologies and mathematical models to record from the brain and understand how seizures occur, with a view to developing devices that can detect, predict and eventually prevent seizures. The research conducted at CfNE has attracted the attention of a major donor leading to the commitment of \$5m in 2015 to establish The Clifford Chair in Neural Engineering at the University. <http://www.cfne.unimelb.edu.au/about/welcome/>

Advanced human imaging facility

The University of Melbourne is also a partner in a successful EIF allocation under the umbrella of the National Imaging Facility. This is a national collaborative facility that provides openly accessible world-class equipment for basic imaging research allowing Australia to remain at the forefront in imaging-related science. In March 2014, the University of Melbourne node installed an ultra high-field 7 Tesla magnetic resonance imaging scanner that is being used to study both normal and abnormal brains.

The EIF investment is complemented by the State government's Victoria's Science Agenda Investment funds. The Melbourne facility collaborates closely with associated institutes, public teaching hospitals, and national and international centres of research excellence around use of imaging technologies to advances in the diagnosis and the eventual treatment of a wide range of neurological disorders. <http://www.melbournebraincentre.edu.au/>

⁴ CfNE <https://blogs.unimelb.edu.au/researchservices/2011/06/06/about-our-data-centres/> and <https://pursuit.unimelb.edu.au/articles/q-amp-a-how-algorithms-are-fighting-epilepsy>

AuScope - Australian Geophysical Observing System

AuScope is the national provider of integrated research infrastructure to realise the collective potential of Australian Earth and Geospatial Science researchers. AuScope contributes significantly to all aspects of Australia's environmental monitoring and management, and provides a platform for innovative commercial developments in the spatial, minerals, energy and water industries.

In 2010 AuScope was awarded \$23 million under EIF to create a new Australian Geophysical Observing System (AGOS). AGOS was designed to enable the collection of new baseline data including surface geospatial and subsurface imaging and monitoring data. This data can provide an understanding of the physical state of the accessible crust of the Australian continent. The Government's \$23 million investment is leveraging a further \$82 million from the project partners. AuScope is comprised of 23 partners including CSIRO, Geoscience Australia, 11 universities, and state government agencies <http://www.auscope.org.au>

Emission reduction laboratory

EIF investment has led to the establishment of an emissions reduction laboratory that officially opened at the University in September 2016. It is part of a \$7.5 million activity supported by the Cooperative Research Centre CO2CRC. CO2CRC Limited is one of the world's leading collaborative research organisations focused on carbon dioxide capture and geological sequestration.

The laboratory is investigating techniques to reduce the cost of implementing carbon capture and storage technologies in which carbon dioxide is separated from industrial processes before being cooled and compressed so that it can be transported. The CO₂ is then injected deep underground, where the carbon will settle and remain. The laboratory is part of an interconnected set of assets in Australia that will reduce the cost of carbon capture and storage while ensuring safety over the longer-term.

Transformed Graduated Learning Spaces

Custom-designed learning environments are essential to ensure Australia's higher education sector can deliver higher quality tuition. EIF funding of \$16.3 million enabled the University of Melbourne to fast track a major capital works program to turn more than 13,000 m² of traditional facilities into an integrated suite of contemporary teaching and learning spaces. The facilities span seven graduate learning spaces linked to the University's Graduate Schools of Education, Science and Land and Environment.

National e-infrastructure capability groupings

As well as these significant facility investments from EIF, University of Melbourne researchers have been deeply involved in using many of the research infrastructure investments over the past decade that were stimulated by the EIF funded SuperScience scheme, and latter part of the NCRIS allocation. <https://www.education.gov.au/super-science-initiative>

The case studies highlighted in the 2016 National Research Infrastructure Roadmap published in February 2017, and complemented by the case studies published by the individual capabilities, demonstrate the clear links between sustained and reliable infrastructure funding support, world-class cutting-edge research and tangible outcomes of real benefit to Australian society and the

economy. Such benefits are also documented in reports from the two NCRIS capabilities for which the University of Melbourne is currently the host administrative organization – the National eResearch Collaboration Tools and Resources (NeCTAR) <https://nectar.org.au/nectar-impact/> and AURIN <https://aurin.org.au/case-studies/>.

National eResearch Collaboration Tools and Resources project (NeCTAR)

The National eResearch Collaboration Tools and Resources project (NeCTAR) has used its EIF funding to support two main strands of activity: NeCTAR Labs (online environments to support collaborative research) and the NeCTAR Research Cloud, a single integrated cloud currently supporting over 7000 researchers across the country. The ARC Centre of Excellence for Plant Energy Biology, for example, uses the NeCTAR cloud to support its research collaborations with the Max Planck Institute in Germany.

The Research Cloud was an unprecedented scale of investment (total government investment of \$61m) that attracted \$54m in co-investment from Australian Institutions. Without EIF funding, cloud-based technology for research would be more difficult to access, slower and myriad collaborations would not have occurred. <https://nectar.org.au/>

Bioplatforms Australia

Bioplatforms Australia enables Australian life science research by investing in state-of-the-art infrastructure and associated expertise in the specialist fields of genomics, proteomics, metabolomics and bioinformatics. EIF funds have been critical for building and maintaining bioinformatics capability for the nation, which researchers from across multiple institutions draw on. It has created connections to corresponding international capability at the European Molecular Biology Laboratory through the establishment in 2015 of the linked national Bioinformatics Resource headquartered at the University. Research is driving improved outcomes for industry, for example by creating genomic datasets to enable increased yield and defence against wheat pathogens.

EIF funding has also supported the metabolomics research infrastructure and expertise for Australia, with headquarters at the University. Funding has been directed towards instrumentation including cutting edge Imaging Mass Spectrometry enabling the University of Melbourne to be the first in Australia with the ability to undertake spatial distribution of metabolite capability for the Australian research community and industry.

This work investigates biological systems and their metabolism, seeking to understand how metabolism changes with differing influences (for example the effect of salinity on plants, the effect of climate change on coral health or the effect of different diseases on humans) and how the change reflects who they are. Metabolites (small molecules) are important because, for example: 100% of all agricultural products (herbicides, pesticides, fertilizers) are small molecules; 91% of all known drugs are small molecules; and 60% of all drugs are derived from pre-existing metabolites.

<http://www.bioplatforms.com/>

https://docs.education.gov.au/system/files/doc/other/bioplatforms_australia.pdf

Australian Urban Research Infrastructure Network (AURIN)

Funded by the Australian Government through EIF (\$20M) and NCRIS (\$8M), the AURIN initiative, hosted by the University of Melbourne, is building the e-research infrastructure to enable better understanding of the current state of Australia's cities and towns and to meet the challenges they face. It consolidates access to 1,800 data sets.

AURIN draws on more than 80 institutions across Australia to provide access to data to help answer some of the country's most pressing questions related to urbanisation, for example related to population growth, densification, affordable housing, energy efficiency and social wellbeing. In addition to access to data, AURIN provides modelling and analytical tools to help researchers make meaningful sense of the data. On the issue of housing affordability for example, AURIN capability was vital for assisting researchers from the University of New South Wales' City Futures Research Centre to 'unpack' Sydney's housing affordability crisis to provide evidence-based advice for policy-makers and industry partners. <https://aurin.org.au/>

Case studies can be located here: <https://aurin.org.au/blog/category/latest-news/>

Better Universities Renewal Fund

An earlier program – the Better Universities Renewal Fund – also made a valuable contribution to upgrading Australia's aging university teaching and learning building stock. The University of Melbourne was able to improve the learning environments for its students through the following investments:

Chemistry redevelopment

The School of Chemistry consists of the original 1938 building and an extension built in 1963. Both buildings had had very little renovation over time were in need of upgrade to enable them to adequately support the current and future requirements for the teaching of Chemistry and research.

Baillieu Library Redevelopment

The Baillieu Library is the University's major resource library, housing significant humanities collections, key cultural collections and student study spaces. While having had minor refurbishments over the past decade there had been no major renewals of building fabric or services in this period. With more than 40,000 students on the Parkville campus, the library faced significant challenges in providing the learning laboratory in which students can excel as individuals and in study groups. BURF funds enabled the University to provide the first significant upgrade of Baillieu Library facilities in the last decade, focussing on student facilities.

Faculty of Arts Graduate School teaching spaces

The development of the Graduate School was supported by updated facilities within an historic building. The Graduate School houses existing, professionally-oriented graduate degrees, and Research Higher degrees. The Graduate School now provides a dynamic environment for teaching and learning through the provision of custom- designed and fitted teaching and learning spaces.

Brownless Biosciences Student Centre

The Brownless Library services the needs of the Faculty of Medicine, Dentistry and Health Sciences. This project incorporated the student facing services associated with BioScience's Student Centre's activities into the Brownless Library, co-locating those services with the Library's services and upgrading the ground and first floor of the Brownless to provide student-centric, active, collaborative and social learning spaces supported by rich IT environments and relevant physical collections. The upgrade provides students enrolled in the Melbourne Model Biosciences degree with a "one-stop-shop" for their library and services needs.

Baldwin Spencer Student Centre and the Science Student Centre

The upgrade out-dated facilities have delivered Learning Centres with space for teaching, student lounges, student facing support activities, work spaces and meeting spaces.

Identity Management System

The University of Melbourne's existing infrastructure in relation to identification and access management (authentication and authorisation) was approaching obsolescence and no longer met the needs of the University's teaching and research. The project replaced the legacy infrastructure with a contemporary solution to meet current and emerging needs of the University. The solution has enabled online delivery of teaching materials to students in a more seamless manner and delivered real-time online student and staff services such as enrolment and appointment. The University research community is also deriving benefits by enabling access to research materials from collaborators nationally and internationally.