NCRIS
National Research Infrastructure for Australia
An Australian Government Initiative

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Committee Secretary
Senate Education and Employment Committees
PO Box 6100
Parliament House
Canberra ACT 2600

27 February 2015

Dear Secretariat,

Re.: Inquiry into the principles of the Higher Education and Research Reform Bill 2014

The Australian National Fabrication Facility (ANFF) welcomes the opportunity to respond to the inquiry into the principles of the Higher Education and Research Reform Bill 2014. This submission relates to only part (f) of the terms of reference – Research Infrastructure.

ANFF has been funded under the National Collaborative Research Infrastructure Scheme (NCRIS) to provide access to state-of-the-art micro and nanofabrication facilities. ANFF, with its focus on the fabrication of new materials and devices, is a highly relevant organisation for fostering Australian innovation and university-industry collaborations.

Last year, 2,200 researchers accessed ANFF. Of the 128,000 hours used, 23% of the activity was associated with industry projects. However ANFF, together with other NCRIS capabilities faces an uncertain future. This activity will cease, with the loss of 90 highly skilled technical staff, unless further funding for NCRIS is released.

This submission calls for **continuity of funding of funding for research infrastructure on and ongoing basis regardless of the outcomes of the Bill**. A roadmap for long-term research infrastructure investment and a commitment to funding the roadmap is essential for increased productivity in the sector.

Yours sincerely,

Rosie Hicks
CEO - Australian National Fabrication Facility Ltd

Background

In 2007, the Australian National Fabrication Facility Pty Ltd (ANFF) was established under the National Collaborative Research Infrastructure Strategy (NCRIS) to provide access to state-of-the-art micro and nanofabrication facilities. These facilities enable researchers and industry to process hard materials (metals, composites and ceramics) and soft materials (polymers and polymer-biological moieties) and transform these into structures that have application in sensors, medical devices, nanophotonics and nanoelectronics.

Nanotechnology is a transformational technology impacting on many sectors of industry: communications and information technology; health; defence and security; biotechnology; agriculture; minerals recovery and processing; construction; and education. At its heart is the ability to fabricate at the nano-scale (to 10^{-9} m) where surface effects become very important and high functionality can be achieved in a very small volume at a low materials cost. Such fabrication typically takes place in a dust-free, clean room environment using special equipment. This may build structures by top-down patterning techniques or using the self-assembly characteristics of chemicals. Providing researchers with expert support and the facilities to fabricate prototypes for scientific and commercial evaluation is the role of ANFF. It users cover the gamut of pure and applied science through to technology and engineering.

On the world scale nanotechnology products are predicted to constitute an annual market of $US 3 trillion by 2020[1]. Currently there are in excess of 150 Australian companies listed as active in nanotechnology. The number is expected to grow significantly as the benefits of using nanotechnology impact on established technologies and offer new solutions. An analysis of the latest Australian Research Council (ARC) funding outcomes shows that nanotechnology-related Discovery projects account for 13% of the annual total, with the annual funding by ARC in all grant categories for nanotechnology-related research exceeding $80 million.

ANFF consists of eight university-based nodes which provide researchers and industry with complementary access to state-of-art fabrication facilities. Members of the company include 19 universities and CSIRO. Its facilities are provided to all Australian researchers and to industry. It has fostered linkages with overseas research groups and aided in developing collaborative research projects with groups such as the US Military Laboratories.

In 2013-14, ANFF serviced the research needs of 2,200 researchers, with its use by industry totaling 23% of its operational hours. Significant innovations developed using the ANFF facilities are detailed in case study reports[2] in which 61 innovations of commercial significance are described.

Supporting research infrastructure

As a research infrastructure funded by NCRIS, ANFF has a demonstrated track record for acting as an intermediary between research and business. However, stop-start funding of the National Collaborative Research Infrastructure Strategy (NCRIS), has reduced the sector's productivity. Stability of funding beyond the current 18-month, then 12-month extensions is essential to maximise the return on the investment. ANFF plays a key role in the translation of research because it allows the development of devices up to pre-production quantities without the significant investment in capital equipment, such as cleanrooms, that would be otherwise required. This significantly lowers the risk associated with device development. However, industry must have confidence that the facility will continue to operate until development has been completed.

> Stability of funding is critical. A roadmap for long-term research infrastructure investment and a commitment to funding the roadmap is essential for increased productivity in the sector.

[1] M C Roco, C A Mirkin and M C Hersam *Nanotechnology research directions for societal needs in 2020:* summary of international study http://www.nsf.gov/crssprgm/nano/reports/MCR_11-0301_Nanotechnology_Research_Directions_To_2020_JNR13.pdf

[2] ANFF Providing Solutions – A Casebook 2012 http://www.anff.org.au/anff-2012-casebook.pdf
ANFF Building Competitive Advantage – A Casebook 2013 http://www.anff.org.au/anff-2013-casebook.pdf
ANFF A Platform for Innovation - A Casebook 2014 http://www.anff.org.au/anff-2014-casebook.pdf

Concluding Remarks

The impact of investment in research infrastructure is felt across many sectors beyond Higher Education. Australia's ability to tackle our challenges, including those in health, resources, defence and agriculture, depends on providing researchers with the tools to undertake their work. Funding for research infrastructure must be provided on an ongoing basis regardless of the outcomes of the Bill.