In Confidence

Office of the Minister of Science and Innovation

Cabinet Business Committee

Update on identifying the National Science Challenges

Proposal

1. I propose that Cabinet note the progress on the development of the National Science Challenges, which will be used to create a new strategic approach to drive science investment in New Zealand.

Background

2. The National Science Challenges will be a set of important issues that New Zealand faces in its future development where science has a major role in addressing. The Challenges will provide a strategic approach to science investment that will align, coordinate and fund science research programmes to tackle these Challenges.

3. The first stage in the process has been to identify potential Challenges, engaging with both the general public and the science sector, providing an opportunity to raise the profile of science and innovation among New Zealanders.

4. On 27 August 2012 Cabinet agreed [CAB Min (12) 30/6] to a broad public engagement process to support identification of the National Science Challenges, including a television campaign and broad consultation with science users and science providers. The public and sector engagement process has recently been completed and this paper outlines the high level results of this engagement and the process for selecting the Challenges for Cabinet's consideration in April.

Comment

5. A broad public and sector engagement to guide the development of the National Science Challenges took place from November 2012 to end-January 2013. The science sector engagement to identify possible Challenges included a series of workshops for science users and providers, which assisted in fostering a shared understanding of how to develop a Challenge. The workshops, held at six major centres around New Zealand between October and December 2012, involved approximately 500 science sector participants.

6. The engagement process has resulted in 257 submissions from the science sector (from 486 unique exchanges on the website), with many submitters putting considerable effort into developing possible Challenges, including outlining the goals and objectives of the Challenge, how important it is to New Zealand, and the type of research required to address their Challenge. The workshops also aided researchers in working together, leading to many joint submissions for Challenges being developed across the science sector.

7. The public media campaign was supported by a television advertising campaign featuring scientists and children discussing potential Challenge areas. Analysis of the effectiveness of the campaign to date, provided by the advertising agency, shows a particularly strong campaign performance across all demographic groups, but particularly with youth. The survey data shows a positive and substantial observed impact on the perception of the role of science and technology in creating a prosperous future for New Zealand. The survey also showed an impact of the media

campaign on making people more favourably consider careers in the fields of science and technology.

8. The advertising campaign has been very successful in driving people to a dedicated website to enable engagement on the Challenges. This website, *The Great New Zealand Science Project,* includes short films on each of the potential Challenges illustrated in the television advertising campaign. These films raise awareness about what science can do for New Zealand and have elicited submissions from the public on what the National Science Challenges should be. The second television advertisement has had 36,893 views on Youtube (compares to 790 views for the first advertisement before Christmas).

9. This website has received 28,578 unique visitors (up until Saturday 19 January), and 111 public submissions and 563 further comments have been made on the website during this time period.

10. The media campaign also stimulated discussion and commentary on science issues via a New Zealand Science Facebook page (as at 19 January 2013: 12,189 'likes' and 450,889 unique browsers). The discussion on Facebook will be used complement the website information, and the general trends will form a high-level narrative to assist the identification of possible Challenges.

Expert panel to identify shortlist of National Science Challenges for Cabinet approval

11. The sector and public submissions will shortly be considered by an expert panel of 11 scientists, who collectively have a broad range of scientific knowledge and different research experience. The proposed panel members (set out below) have been chosen on the basis of their recognition as leading strategic and future thinkers, focussed on outcomes for New Zealand, qualified to judge a research area and understand economic principles and trade-offs.

12. This panel will recommend a number of options for possible Challenges. The panel will also provide ongoing technical and strategic advice to my officials on the implementation and development of possible Challenges. I will submit the Panel's recommendations to Cabinet in April to select up to ten Challenges. I propose to make a public announcement after the Cabinet decision.

TABLE 1: NATIONAL SCIENCE CHALLENGES PANEL MEMBERS

Name	Experience	Area
Professor Sir Peter Gluckman (Chair)	Prime Minister's Chief Science Advisor, previously Director of the Liggins Institute and the National Research Centre for Growth and Development; Fellow of the Royal Society (London) and the Royal Society of New Zealand. Awarded KNZM.	Health
Jacqueline Rowarth	Professor of Agribusiness at the University of Waikato. Fellow of the New Zealand Institute of Agricultural Science and Companion of the Royal Society of NZ. Awarded a CNZM for services to agricultural science.	Agriculture
Ian Ferguson	Departmental Science Adviser for the Ministry for Primary Industries and Chief Scientist of Plant and Food Research. Expertise in plant and fruit physiology, postharvest and horticultural science, biochemistry and biotechnology. Fellow of the Royal Society of NZ.	Plant Biology
William Denny	Leads the Medicinal Chemistry Group at the Auckland Cancer Society Research Centre. Co-founding scientist of Proacta Therapeutics. Won the Rutherford Medal (Royal Society of New Zealand), and Adrian Albert Medal (UK Royal Society of Chemistry). ONZM for services to cancer research.	Health and Society
Elf Eldridge	Physics PhD student with the MacDiarmid Institute developing nanopore technology. Involved in a number of emerging science education groups.	Nanotech

Peter Hunter	Professor of Engineering Science and Director of the Bioengineering Institute at the University of Auckland and Director of Computational Physiology at Oxford University. Member of the Callaghan Innovation Board (and recently a member of the Ministry of Business, Innovation and Employment's Science Board). Fellow of the Royal Society (London) and the Royal Society of NZ, member of the World Council for Biomechanics, both the American Institute and International Academy for Medical and Biological Engineering.	Bioengineering
Mary O'Kane	NSW Chief Scientist and engineer. Chair of the Australian Centre for Renewable Energy, Chair of the Development Gateway International, Chair of the CRC for Spatial Information, and a director of the Australian Business Foundation. Vice President of the Academy of Technological Sciences and Engineering, Australia.	Engineering
David Penman	Consultant, previously Assistant Pro Vice Chancellor Research, Lincoln University, and until 2006 overall Research Manager at Landcare Research. Entomologist and agricultural scientist, with a focus on 'integrated pest management'. Previous chair of Governing Body for the Global Biodiversity Information Facility (2005-09)	Biosecurity / Environment
Charles Royal	Researcher and currently a member of the Ministry of Business, Innovation and Employment's Science Board. Former Director of Graduate Studies and Research at Te Wānanga o-Raukawa, Ōtaki, where he was also Kaihautū (convenor) of a graduate programme in mātauranga Māori.	Māori
Richie Poulton	Director of the Dunedin Multidisciplinary Health and Development Research Unit, based at the University of Otago. Board member of Health Research Council. Fellow of the Royal Society of NZ.	Health and Society
Rachael Wiltshire	Samuel Marsden Collegiate, Wellington, Rachael graduated as the school's Dux in 2012 and has accepted a scholarship to Auckland University commencing a BA/BSc degree in 2013. Royal Society science award winner, CERN visit and London International Youth Science Forum, 2012.	Youth

13. The criteria the Panel will be considering in selecting the Challenges include:

    - Each Challenge targets a high-level goal which, if achieved, would have a major and enduring public benefit for New Zealand
    - There is wide public consensus that the Challenge will address a major issue or opportunity of wide public importance for New Zealand
    - Scientific research is essential to solving the Challenge
    - New Zealand has the broad scientific capability and capacity to undertake the Challenge successfully, and
    - There is sufficient external motivation and linkages for the research results to be successfully implemented to achieve the Challenge goal.

14. Each Challenge is likely to encompass areas of research work for which there is already significant scientific research investment being funded by government agencies and other entities. The National Science Challenges will have a significant effect on the future development and allocation of science funding, providing strong investment direction and driving alignment of science and technology spending across government. Their implementation will be supported with $60 million additional funding over four years, allocated in Budget 2012.

15. The Challenges will be developed and implemented in line with some key features on how they will be constructed, managed and governed, namely:

    - Each Challenge will have a strong, virtual governance structure (new or existing), with clear leadership and accountabilities across the researchers and institutions involved in the Challenge.
    - Each Challenge is likely to involve a broad portfolio of multi-disciplinary research activity that will involve collaboration across a number of research providers.

- Each Challenge will involve within it a number (eg 2 to 6) of inter-related research themes that are integrated and co-ordinated to provide a plausible pathway to achieving the Challenge (with each research Theme involving a number of discrete research components).
- Each Challenge will seek to combine all of the relevant expertise available across the science sector in New Zealand to achieve the Challenge.
- Each Challenge will be clearly linked with international research activity that will support the achievement of the Challenge.
- Each Challenge will exhibit strong collaboration between researchers and intended end-users of the research activity, including, where appropriate, obtaining investment from end-users in the Challenge's research.
- Each Challenge entity will map and include relevant existing research into the scope of the Challenge.

16. There will be a need for strong governance arrangements to achieve this new strategic direction, and these will need to be developed and put in place following Cabinet's decision on the Challenges themselves. Details of the governance, funding and administrative arrangements necessary to implement the Challenges will be addressed in subsequent advice to Cabinet later in 2013.

17. Given the nature of the scope and scale of the Challenges, it is expected that implementation will be staggered, with a focus in the first year on three to five Challenges. The selection of those initial Challenges will depend on the readiness, available capacity and capability in the sector to undertake the work. Further engagement with the relevant research communities within the science sector will be undertaken in developing implementation of the Challenges.

TABLE 2: SUMMARY OF TIMELINE

November 2012 – January 2013	February – March	April	May – August	August – December
Public and science sector engagement Television and social marketing campaign (website and Facebook)	Expert panel reviews submissions and recommends Challenges to Cabinet	Cabinet decides Challenges *Press Release*	Officials, in collaboration with science sector, develop first tranche of Challenge research strategies	Governance arrangements for overall Challenges established. Contracting of first Challenges. Further development of remaining Challenges in collaboration with sector and development of the Statement of Science Investment Priorities *Press Release*

Relationship between the National Science Challenges and other science funding

18. The Challenges selected by Cabinet in April will address the biggest science issues facing New Zealand, and it is likely many of the Challenges will involve areas of research where significant work is already being undertaken. An integral aspect of funding and designing the detailed research components of each Challenge will be working with the sector to map this existing research. This mapping will ensure that we do not duplicate current research and that we maximise the value from the additional Challenge funding by funding the critical components required to achieve each Challenge.

19. The Challenges, and consequential mapping of much of our current research, will also provide an opportunity to simplify funding processes for managing New Zealand's major science investment. After we have identified the Challenges I propose to undertake further work on how the Challenges are integrated with the wider science system, and to consider the amount of funding that should be allocated to the Challenges and to the other science priorities which are not linked to one of these Challenges.

20. This work will be addressed with the 'Statement of Science Investment Priorities' to be developed later this year in consultation with other relevant Ministers and the sector. This will include consideration of the amount of funding to be allocated to fund Challenges as well as other areas of science (for example, infrastructure) that fall outside the Challenges. I will be seeking Cabinet approval for this Statement later in 2013, to enable the Priorities to inform the 2014 Contestable Science Funding Round.

Risks

21. The selection of up to ten National Science Challenges may raise concerns within the sector about maintaining other broad-based government support for science or that Cabinet does not support the Challenges that are seen as the important issues for scientific work. The Statement of Science Investment Priorities will identify areas of research outside the National Science Challenges that require support and determine the balance of investments across the portfolio. On-going engagement and collaboration with the sector in implementing the agreed Challenges should also help mitigate these concerns.

Consultation

22. Officials at the DPMC and the Treasury have been advised.

Financial implications

23. This paper has no financial implications.

Human rights, gender, disability, legislative and Regulatory Impact and Business Compliance Cost Statement implications

24. This paper does not raise any issues with implications for human rights, gender, disability, legislative, or business risks.

Publicity

25. There will be an announcement on the selected National Science Challenges following Cabinet's decision in April.

26. The public website and Facebook page will remain active until 31 March 2013, a period of two months after the official closing date of public submissions. This is to provide further opportunities for online discussion and a resource for schools' engagement in the National Science Challenges.

Recommendations

27. The Minister of Science and Innovation recommends that the Committee:

    1. **Note** that the broad public and science sector engagement (including television and social marketing campaign) on the National Science Challenges during October 2012 to January 2013, has been successful in raising public awareness of the importance of science and has generated nearly 370 submissions on possible Challenges.

2. **Note** that these submissions will be considered in February/March by a panel of 11 experts chaired by the Prime Minister's Chief Science Advisor, Professor Sir Peter Gluckman, who will recommend a selection of key Challenges for Cabinet's consideration.

3. **Note** that I will submit recommendations to Cabinet on the Challenges in April, to be implemented over the next year.

Hon Steven Joyce
Minister of Science and Innovation