

**Vote Research, Science and Technology**

# Baseline Alignment Proposal

8 March 2010

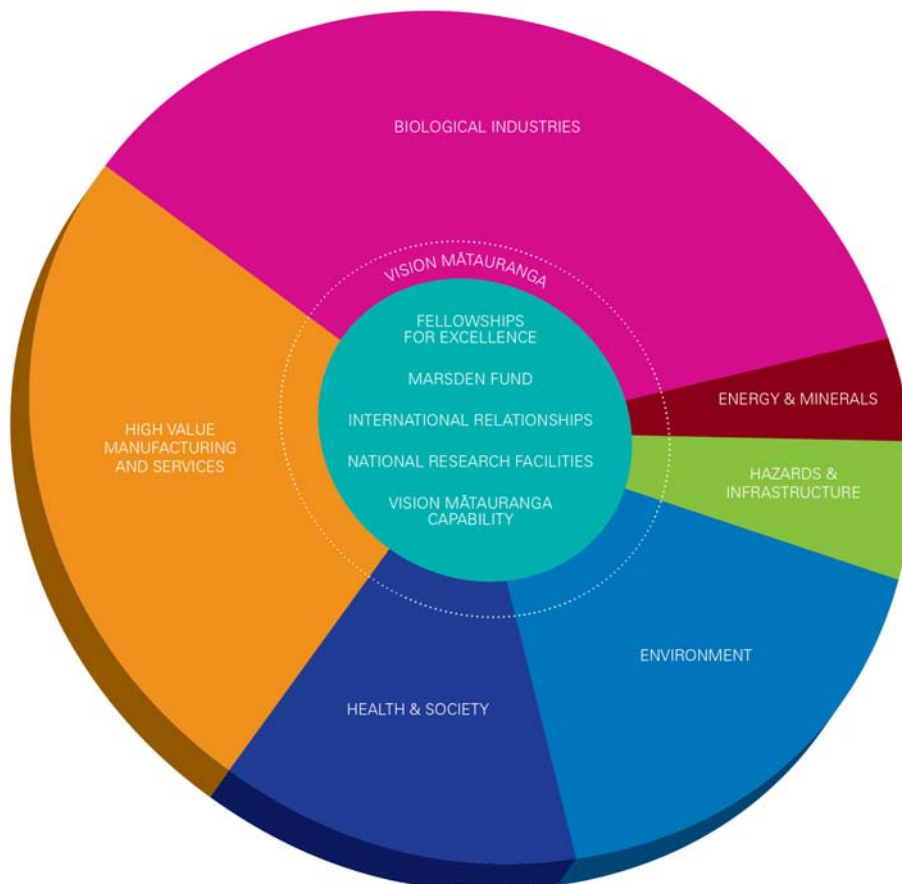
Submitted by:

**Hon Dr Wayne Mapp**

## Section 1: Alignment to Government Priorities

The Government has set a challenging goal to lift New Zealand's economic performance by 2025, and as one of the six policy objectives of the medium term economic growth agenda (EGA) science, innovation and trade are expected to be essential drivers of the export-led growth. As well as underpinning economic objectives, science plays a central role for other government objectives such as improving health, environmental and social outcomes.

The EGA identifies Processed Foods and Dairy; High Tech Manufacturing and Services; and Petroleum and Mineral Resources as key growth sectors alongside our core primary industries. Science and technology can make a greater contribution to the competitive advantage of firms in these sectors and to the primary industries. The first step in getting more out of science happened in December 2009 when Cabinet agreed to new priorities and a new structure for Vote RS&T that align with the key growth sectors. The government also set up a Taskforce that among other things looked at how Crown Research Institutes can deliver more to the economy. The new RS&T priorities agreed by Cabinet in December 2009 are: high value manufacturing and services; biological industries; energy and minerals; hazards and infrastructure; environment; and health and society.



In the next two years, as well as focusing on the EGA sectors, my intent for the science sector is:

- To improve connections between science and the market place by both improving business support and commercialisation, and making changes to Crown Research Institutes that will facilitate linkages and long term delivery to the sectors they support.
- Invest in science infrastructure, such as high performance computing, that will allow us to participate in international 'big science' activities [*deleted – confidentiality of advice*], that have significant benefits that New Zealand can leverage from.
- Attract and build science leadership, strengthen bilateral and regional international collaborations; and build capability to unlock the innovative potential of Maori knowledge resources and people.

The most critical things that need to happen to achieve these priorities are to provide a step-change in how we support business R&D and facilitate technology transfer, and to implement the CRI Taskforce's recommendations. How New Zealand builds capability through investing in excellent researchers, international relationships and research infrastructure must change from the status quo, and become more strategically targeted as these form the basis of a high functioning science system over the medium to long term.

My Vote RS&T Budget package for 2010/11 primarily focuses on Business R&D initiatives:

- a technology development grant for R&D intensive firms aimed at stimulating firms to step up their innovation and productivity
- a technology transfer voucher to support and enhance linkages between firms and research organisations
- other technology transfer initiatives to get the best possible value from the Government's existing investment in RS&T.

The Budget package also includes:

- the Large-Scale Research Infrastructure strategy of which the first item to be considered is High Performance Computing. A business case requiring both capital and operating funding for High Performance Computing is under development. The

research infrastructure strategy comprises other initiatives that will be developed over the coming years.

- Two new fellowship initiatives; the first is seed funding for a new prestigious fellowship for emerging researchers, to commence on 1 July 2010. The second, suggested by the Prime Minister's Chief Science Adviser, is to scope a scheme to attract entrepreneurial talent to New Zealand. The start of this initiative is being deferred to 2011.

To achieve a step up in Business R&D requires substantial funding, and this is mainly being funded through the Prime Minister's rolling maui. I intend to reprioritise \$20-25 million per annum from within Vote RS&T to contribute to fund both Business and non-Business R&D new initiatives. Funding will be reprioritised from areas of lower immediate economic impact into these areas. The principles used in undertaking reprioritisation are to not break existing research contracts with the research sector and, as far as possible, maintain core strategic research capability particularly where it aligns or underpins the EGA.

The main fiscal and policy risks are the magnitude and rate of change required to make the required step change in Business R&D. Although Vote RS&T is increasing overall through new funding for the majority of the business initiatives, the reprioritisation of contestable science funding may be seen by the science sector as supporting business at the expense of core research. This negativity could compound if uptake of the new technology development grant is initially slow. Although it is difficult to predict uptake for initiatives that are new to the sector, I believe that this risk is justified as unless Business R&D increases significantly in the next 3-5 years, we are unlikely to achieve the economic growth that New Zealand needs.

## Section 2: New Funding and Reprioritisation of Vote RS&T

### 2.1 New initiatives primarily funded by new funding appropriated to Vote RS&T

The Business R&D and technology transfer initiatives below are primarily funded from the Prime Minister's rolling maul, as below.

	2010/11	2011/12	2012/13	2013/14
	\$m	\$m	\$m	\$m
<b>New RS&amp;T funding from the PM's rolling maul</b>	30	50	70	75

To fund all the business R&D initiatives, some reprioritisation will still be required; this will be in the order of \$6.5 million in 2010/11 and \$8 million in 2011/12 and will be funded from the \$20-25 million of savings I am proposing for reprioritisation.

#### (i) New initiatives – Supporting Business R&D and Technology Transfer

INITIATIVE	DESCRIPTION
<b>BUSINESS R&amp;D INITIATIVES</b>	
<b>Technology Development Grant</b>	A discretionary programme targeted at R&D intensive firms to support a broad range of development activities that the firm undertakes
<b>TECHNOLOGY TRANSFER INITIATIVES</b>	
<b>Technology voucher (2-year pilot)</b>	An initiative aimed at increasing linkages and technology transfer between firms and research organisations
<b>Centre of excellence in technology transfer (PMCSA)</b>	An initiative aimed to develop a stronger, more capable national network of commercialisation offices
<b>Contingency for technology transfer</b>	A contingency to fund further technology transfer initiatives to address gaps that currently exist within Vote RS&T

The suite of new initiatives I propose for business R&D are supported by Cabinet. They clearly align with Government priorities, and represent a step change for what is currently delivered through Vote RS&T. Increasing support for business R&D and technology transfer is crucial to the Government's dual goals of:

1. Increasing New Zealand firms' own investment in R&D to support increased productivity; and
2. Maximising the economic returns of the Government's investment in RS&T, especially in Crown research institutes (CRIs) and universities

I propose the introduction of a technology development grant to enhance the support already provided through the Technology New Zealand (TechNZ) suite of programmes.

Currently, TechNZ supports research projects and the development of capability within firms. TechNZ is a highly discretionary programme and involves intensive client management. In contrast, the new technology development grant is proposed to target R&D intensive firms to support a broad range of R&D activities. It will complement the existing TechNZ programme in the following ways:

1. The grant will be available to firms that justify a more hands off approach to grant approval, speeding up approval processes and reducing administration, something that firms are keen to see happen.
2. It will fund a firm's programme of research and development rather than one-off high risk projects.

I also propose introducing a technology transfer voucher that aims to improve linkages and technology transfer between firms and research organisations. In order to maximise the economic returns of Government's investment in RS&T, New Zealand needs to improve the transfer of knowledge and technology from our publicly funded research into our firms.

The introduction of the technology transfer voucher will also complement the existing TechNZ scheme and the proposed new technology development grant. It will target firms that have the potential to grow through the adaptation and adoption of new technology, but who lack the in-house capability to do the research themselves. It is designed to put the power in the hands of the firms and support the development of enduring partnerships between firms and research organisations. It will also complement recommendations from the CRI Taskforce that CRI's should increase their focus on technology transfer to their relevant sectors and stakeholders.

Another initiative that I am keen to progress is a centre (or centres) of excellence in technology transfer. This is to develop a national network providing support and training to research organisation commercialisation offices. This initiative will also complement the

technology transfer voucher through supporting the development of capability in CRIs and universities, increasing their ability to engage with firms.

I am also proposing a contingency for the development of further technology transfer initiatives. I have requested officials propose other technology transfer initiatives that can be developed and launched during the year. These initiatives will be developed alongside the CRI Taskforce recommendations to be implemented and will include:

*[Information deleted in order to maintain the current constitutional conventions protecting the confidentiality of advice tendered by ministers and officials]*

Implementation options are still being developed. Evaluation criteria will be developed as part of the implementation plan and be evaluated as part of MoRST's ongoing evaluation programme.

## 2.2 Vote RS&T initiatives funded from reprioritisation

### (i) New initiatives – Large Scale Research Infrastructure Strategy

INITIATIVE	DESCRIPTION
High performance computing	Development and operation of national high performance computing (HPC) facilities and the underpinning associated collaboration tools and services
Contingency for Infrastructure initiatives	Funding for other infrastructure items such as <i>[deleted – confidentially of advice]</i>

A comprehensive Large-Scale Research Infrastructure (LSRI) Strategy is being developed to plan and coordinate investments in large, advanced facilities that are essential to support the science sector, with a planning range of the next five years. The strategy aligns with the EGA and supports trans-Tasman commitments. The Strategy is yet to be completed, but the emerging first priority is establishing a National High Performance Computational (HPC) Network.

Special investments by Government are warranted for large scale facilities, due to their size, advanced nature, and high rates of technological obsolescence that make them difficult for the research sector to afford from within full-cost funded project revenues. Governments in most developed countries see the need to invest heavily in LSRI alongside the sector, and this is raising the international standard of science. New Zealand risks being left behind if we do not raise the standards of infrastructure available to the research sector.

Researchers are fully-cost funded, and it is reasonable to expect that facilities operators should be able to levy users with charges to meet ongoing operating costs and depreciation of advanced facilities. However, in the case of some LSRI, the assets become technologically obsolete within a few years and the sheer scale of costs make user charges a barrier to researcher use. Under these circumstances, a level of Government subsidy to defray these costs is in order.

To address the failure of the research market to be able to fund the amortisation costs from grants, there are two options open to Government:

1. Incorporate, in whole or part, an allowance for replacement costs within the recurrent funding grant to the owners of the LSRI asset(s) with a binding agreement that this will be used for that purpose only; or



2. Make no allowance but provide an assurance that the Government would be prepared to consider a proposal for *de novo* funding supported by a business case, to upgrade or replace LSRI assets when this becomes necessary.

Which option is preferred will depend on the nature of the asset. Where this is most likely to be used in a research environment, then option one is the prudent approach, carrying with it greater certainty of ongoing availability of the asset to the sector. If, on the other hand, the nature of the infrastructure is such that external use for commercial purposes allows a reasonable proportion of these costs to be covered through third party user charges then the grounds to seek a Government subsidy are less compelling. My preference, particularly in the case of the National HPC Network proposal, lies with the first option.

*[deleted – confidentiality of advice]* This bid is for a contingency placeholder for a National High Performance Computational Network. This is for expensive, large, computational platforms (hardware) and associated services including the interface, the collaboration tools and data services, and the software (grid middleware) to deploy the hardware in a manner that is useful for a wide variety of researchers and R&D intensive businesses. (The associated services are necessary to enable researchers to adjust the computing environment to enable their algorithms to work most effectively.)

It is important to note that half of the proposed capital cost of this initiative is for the purchase of the two supercomputer architectures. If the MMP architecture supercomputer were scaled in price by 50%, then the reduction in computer power would be 80% - which would make it a non viable component. Other operations associated with the bid are already scaled in the first year, assuming a gradual building up of the computational services. If the initiative was to be significantly scaled overall, the deployment of computational facilities and services would not be sufficient to meet the needs of the research sector, removing the benefits of timely access for researchers. All costs, which may differ slightly in the final business case, are crucial to the bid and relatively fixed.

The benefits of introducing a HPC network are cross-cutting, impacting on every research priority area and across almost all disciplines. The HPC network enables researchers to access computational platforms and data services that they now require to do computationally intensive research, engage in large scale collaborative work across borders, and create the data platforms that increase the ability of researchers to solve large scale, international questions, such as modelling water availability, climate change, etc. Computational modelling

is well established internationally as a third pillar of research, alongside theory and experimentation.

Realising these benefits requires leadership and investment in facilitation, technical support and training, to encourage and enable use. Thus, a significant part of this network comprises the services required to deploy the computational facilities across the research sector and build existing and potential user capabilities.

The economic benefits of this research infrastructure proposal will be fully explored in the full case for investment. Benefit measures include increased efficiency of existing research and resource use, and new discoveries that could not have been made before, without the infrastructure.

HPC increases the standard of research per dollar by making it more efficient. For example, using HPC can remove the need for labour-intensive experimentation, and speed up scientific progress, for example, modelling the wind turbulence over potential wind sites, reduces site selection time from a year to a month, at a much lower cost. Also, HPC services give better value from existing data, by enabling data sharing and re-use.

It also increases the number of useful outputs from research, with some examples below. Modelling at higher resolution is possible with greater, and more integrated data sources, and higher computational power. At high resolutions, answers more closely approximate reality. The ability to accurately predict flood inundation, for example, will have huge potential economic benefits by reducing stock losses in emergencies, to inform land use change, or for national infrastructure design. Genome sequence analysis, that underpins genetic selection of animals and plants to increase economic returns to the primary industries, requires large memory-intensive computing, to analyse very large data sets. Most importantly, HPC enables the kind of research that can not be done except *in silico*, such as understanding the behaviour of novel nano-scale materials. Novel materials extract a price premium when applied in high technology manufacturing.

Other examples exist in geospatial database connectivity and analysis tools for modelling petroleum and mineral deposits; modelling impacts of earthquake hazards on physical infrastructure and people; and using automated analysis in selecting drug candidates for physiological medicine.

In summary, HPC enables a step change in the way research is done.

The business case for the HPC is currently being negotiated among the 16 major research sector organisations. I expect to see a draft business case, on which the co-investors have agreed, by the end of March 2010. The process timeline indicates a potential Cabinet paper in August 2010 to consider the final case for investment in this infrastructure.

**(ii) New initiatives – supporting science leadership and top talent**

INITIATIVE	DESCRIPTION
<b>Early-mid career fellowships</b>	Seed funding to create a prestigious early-mid career researcher fellowship
<b>Entrepreneurial Top Talent</b>	Funding to attract top entrepreneurial talent to New Zealand

The major science career stages are PhD, Post Doc, Early Career, Mid Career, and Established Researchers. The body of evidence on human resources in science and technology points to a major gap in support at the early career stage (i.e. the 3-10 years post PhD).

This is the point where many of New Zealand's best and brightest are tempted overseas by well funded fellowships and other career opportunities. I propose introducing a prestigious fellowship scheme that will enable New Zealand to attract, retain and develop the technical leadership and entrepreneurial skills needed to conduct research in the global RS&T system.

The new early-mid career fellowship scheme is designed to be prestigious, based on excellence, and competitive with similar fellowship schemes in Australia. At this stage, it is likely the stipend will be in the region of \$200-250,000 per annum for five years.

Funding for the new fellowships will partly come from reprioritised funds within my proposed Vote RS&T Budget package and I am reprioritising the Foundation's Post Doctoral Fellowship to provide additional funding.

The new fellowship scheme will fund about ten new fellows a year, so that by its fifth year, it will have grown to become a substantial scheme of approximately \$9 million per annum supporting around 50 fellows. The final design of the scheme will be completed before Budget day so that applicants can apply immediately.

Evaluation criteria will be developed as part of the implementation plan. This initiative will be evaluated as part of MoRST's ongoing evaluation programme.

The Entrepreneurial Top Talent initiative is proposed by the Prime Minister’s Chief Science Adviser who is well placed to observe where New Zealand lacks science leadership and entrepreneurial skills. The scheme is designed to enhance New Zealand’s capability in science and technology by attracting top-flight entrepreneurial scientists to New Zealand. This initiative requires detailed scoping and will be started in 2011.

**(iii) Meeting Government Commitments**

<b>INITIATIVE</b>	<b>DESCRIPTION</b>
<b>Food Innovation Network of New Zealand – FINNZ (agreed by Cabinet)</b>	Network of open access food development and commercialisation facilities across New Zealand
<b>Global alliance (agreed by Cabinet)</b>	Funding towards a Global Alliance on Greenhouse Gas mitigation – transfer to Ministry of Agriculture and Forestry from 2010/11 for four years
<b>Productivity Commission (agreed by Cabinet)</b>	Vote RS&T’s contribution to the cost of the Productivity Commission
<b>Creative Commons Law Licences</b>	Administered by Royal Society of NZ - SSC Initiative
<b>CRI team</b>	Increase to departmental funding to MoRST to allow for implementation of the CRI taskforce recommendations
<b>Longitudinal study <i>Growing Up in New Zealand</i></b>	A longitudinal study of child development led by University of Auckland that will help inform social, health and education policy

*Food Innovation Network New Zealand*

Cabinet has agreed to fund the establishment of a network of export-certified food development and commercialisation facilities for new food and beverage consumer products and ingredients; and an overarching network organisation (FINNZ) to improve the connectedness across industry and with researchers.

*Global Alliance*

New Zealand will lead the establishment of the Global Alliance on Agricultural Greenhouse Gas Mitigation Research (“Global Alliance”). Vote RS&T is transferring the required funding to Vote Agriculture and Forestry, for four years as agreed by Cabinet.

### *Productivity Commission*

As agreed by Cabinet, a New Zealand Productivity Commission will be established to improve productivity in both the public and private sectors in a way that is directed at supporting the overall well-being of New Zealanders.

### *Creative Commons*

This is a new initiative to support an annual grant for the administration of Creative Commons Aotearoa New Zealand (CCANZ) at the Royal Society of New Zealand, for the financial years 2010/11, 2011/12 and 2012/13. This recognises the on-going value to New Zealand of the Creative Commons suite of law licences, and the increased workload placed on CCANZ by Government adoption of the licences. CCANZ administers and promotes the New Zealand Creative Commons law licences, which copyright owners across all disciplines and sectors use to licence their information for reuse by third parties. These international licences are fully compatible with New Zealand contract and copyright law.

### *CRI Team*

On February 10, 2010 the CRI Taskforce delivered its report to shareholding Ministers. The report presents a set of recommendations on how the Government can get greater economic impact and benefit for New Zealand from its investment in CRIs.

The Taskforce's recommendations focus on the need to change the attitudes and behaviours of CRIs through streamlined funding processes, strengthened governance structures and clear goals for each CRI. This report has been endorsed by Cabinet and is now Government policy. In order for MoRST, as lead agency, to implement the CRI Taskforce's recommendations additional resources are required. The CRI team initiative is an increase to MoRST's departmental funding to allow for this.

The Taskforce report is part of a wider suite of science and innovation initiatives. This includes setting clearer priorities for the Government's investments in RS&T; simplifying the science funding system; improving incentives for business research and development (R&D); and developing a large-scale research infrastructure investment strategy.

### *Longitudinal study – Growing Up in New Zealand*

This interdisciplinary study led by the University of Auckland will document the development of 7,800 children in the Auckland/Waikato area. It is subject to Cabinet endorsement of the revised funding plan for the study.



## 2.3 Initiatives tagged for reprioritisation

To fund my priorities, I intend to reprioritise \$20-25 million per annum within Vote RS&T. My reprioritisation approach has been first to look for under spends from within the funding currently allocated through the Foundation for Research, Science and Technology, and then to reprioritise areas of committed expenditure. As a first priority, funding will be moved from areas of lower immediate economic impact. The principles used in undertaking reprioritisation are to not break existing research contracts with the research sector and, as far as possible, maintain core strategic research capability particularly where it aligns or underpins the EGA.

The following table summarises what will be reduced or stopped. It is proposed that funding will be moved toward the higher priority initiatives of technology transfer initiatives, large scale research infrastructure and to build science leadership.

INITIATIVE	DESCRIPTION	PROPOSAL
<b>Cross Agency Research Fund</b>	The Cross Agency Research Fund (referred to as the Cross Departmental Research Pool or CDRP) supports policy-related research in Government departments.	Close the fund by 2012/13. No new contracts funded including current applications. Existing contracts honoured.
<b>Health and Society — specifically the Society and Economy part funded through the Foundation</b>	This affects areas of research which: <ul style="list-style-type: none"> <li>• Lead to improved social outcomes and achieving or sustaining an inclusive society</li> <li>• Undertake ‘futures studies’, economic research, and investigates the risks of new technologies</li> </ul>	Social and economic research funding is reduced from approximately \$13 million to \$7.5 million a reduction of 40%.
<b>Teacher Fellowships</b>	The Teacher Fellowships offers primary, intermediate and secondary teachers the opportunity to improve their teaching through working in host organisations for up to 12 months.	Reduce by 50%. This reduces the number from 50 to 25 per calendar year.
<b>Optimising Vote RS&amp;T funding</b>	Use all available one-off and uncommitted funding (i.e. not in current contracts or linked to a funding round).	Use under spend and uncommitted research funds. This has no direct impact on existing capability.
<b>Reducing future funding rounds</b>	As existing contracts end and the funding returns to the contestable pool, I plan to slightly reduce the funding available. This will be pro-rated across all areas as the funding will be used to support capability and infrastructure.	Reduce 2011/12 and 2012/13 funding rounds by approximately 4.5% or \$1.5 - 2 million.

### *Cross Agency Research Fund*

The Cross Agency Research Fund was set up to build capability in Government departments to use research in formulating policy and to fund research that crosses departmental boundaries. It is \$4.3 million per annum.

The risk of winding down of the Cross Agency Research Fund is that it will reduce the ability of some Government departments to undertake cross agency research. This is likely to be a greater issue for small departments like the Ministry of Pacific Island Affairs that have small departmental budgets, and departments whose baselines are under increasing pressure and have or may be considering cutting research funding. Many departments have reduced research as part of their own departmental cost-cutting measures and increasingly expect the Cross Agency Research Fund to fill the gap.

Because the projects are by their very nature cross departmental, it could affect the overall approach to evidence based policy across Government, and means that departments will be required to fund evidence-based policy research in-house.

### *Health and Society — specifically social and economic research*

Reductions are proposed within the Social and Economy part of the Health and Society output expense. This funds a mix of research: social research; 'futures studies'; economic research; and research that investigates the risks of new technologies.

If funding for social research is reduced, there will be no new funding rounds for social research for two years. The next funding will not be run until 2011/12 for funding starting 1 July 2012. Before then five small contracts (average size is \$57,000 per annum) finish, and these researchers will not have the opportunity to re-bid for these contracts. The capability loss through this reduced funding is minor, because most social researchers are not reliant on Vote RS&T as their primary funding source. For the economic research, the Foundation will widen its existing research rounds within other output expenses to incorporate this type of research; for example, impacts of nanotechnology can be aligned with High Value Manufacturing and Services. A risk of this is that social and economic research is less competitive than bio-physical and engineering research in the same area.



### *Teacher Fellowships*

The Teacher Fellowships aim to improve the teaching of science through teachers having the opportunity to work on a science-related project within a host organisation for up to 12 months. Successful applicants work on a project of their own design, or follow an agreed programme. The scheme is currently \$4.3 million per annum. Reducing the Teacher Fellowships by half will reduce the number per year from around 50 to 25. The Royal Society (who administers the scheme) has commented that even though this will affect the scale of their operations, the very best teachers will still get a fellowship at this reduced level.

### *Optimising Vote RS&T funding*

At Budget 2009 Vote RS&T's operating total was \$745 million. In any one year, there are under spends in almost all output expenses because managing multi-year funding commitments is complex. These under spends are often forward committed but the funding has yet to be drawn down. It is typical that the under spends are retained in Vote RS&T.

To fund the Budget package, I propose to make use of as much of the current under spend and unallocated funding possible. As well as one-off funding from forecasted under spends both this year and next year, I have included uncommitted funding that the Foundation is holding (i.e. not in current contracts or linked to a funding round). This is funding that is not currently supporting research capability.

The total aligned to each of the main output areas of the Vote are:

	<b>2009/10</b>	<b>2010/11</b>	<b>2011/12</b>	<b>2012/13</b>	<b>2013/14</b>
	<b>Under spend</b>	<b>\$m</b>	<b>\$m</b>	<b>\$m</b>	<b>\$m</b>
<b>Environmental Research</b>	2.422	4.379	4.357	5.267	5.267
<b>Biological Industries</b>	0.133	3.961	0.982	1.775	1.775
<b>High Value Manufacturing and Services</b>	0.458	0.320	2.682	2.904	2.904
<b>Hazards and infrastructure</b>	1.000	0.000	0.000	0.000	0.000
<b>Energy and Minerals</b>	0.000	0.000	0.000	0.000	0.000
<b>Health and Society</b>	0.550	0.550	0.550	0.550	0.000
<b>Capability (scholarships etc)</b>	2.000	0.500	0.000	0.000	0.000
<b>Other</b>	0.800	0.000	0.000	0.000	0.000
<b>Total</b>	<b>7.363</b>	<b>9.71</b>	<b>8.571</b>	<b>10.496</b>	<b>9.946</b>

The risk of reprioritising this unallocated funding is that it is not available to be used as transition funding for teams that lose their funding in a funding round, nor is it available to build capability in important areas such as water quality and climate change.

*Reducing the Foundation's funding rounds in 2011/12 and 2012/13 by approximately 4.5%.*

Every year approximately \$40-60 million of research contracts finish. The Foundation develops new investment signals and runs funding rounds that result in new research being funded and core capability in the science system being sustained for the medium-long term. Removing funding when contracts finish is considered to be less disruptive to the science sector than breaking contracts to free up funding.

Reducing funding needs to be considered in the context of the suite of changes to the funding system I am making as a result of the CRI Taskforce work and the Business R&D package. It is likely that the CRIs will have a higher proportion of core funding linked to their core purpose, with the expectation that reduced contestability overall will help them manage their core capability. There will be an expectation that they become better linked to business and therefore by raising business R&D this will have a flow-on effect to CRIs.

In reducing funding rounds, I am proposing a pro-rated approach that will reduce all areas slightly rather than impacting on one or two particular areas. The pro-rated approach will inevitably affect some priority areas, however, without breaking contracts there are few options for generating the reprioritisation needed. It may be possible for a more strategic approach to reprioritisation in the out years when more funding comes off contract.

Reducing the level of funding in a funding round will have an effect on overall science capability and I anticipate that there will be some redundancies as a result. In any funding round there is attrition of capability as there are always some research teams that are not refunded. This is because in real terms there is less funding because costs of research rise as inflation and other costs are factored in to new contracts. By removing additional funding from a funding round this effect is amplified.

This does not affect the Foundation's existing funding round that is already underway as the amount of funding available has been published and research organisations have prepared their applications in accordance with the published amount.

## **2.4 Financial implications from the Machinery of Government decisions**

*Short section to be added*

**Section 3 Financial Tables**