



**MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT**
HĪKINA WHAKATUTUKI

Briefing for Incoming Minister Science and Innovation

December 2016

This document has been proactively released. Redactions made to the document have been made consistent with provisions of the Official Information Act 1982.

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1. Portfolio Overview

Purpose

The purpose of this initial briefing is to give the incoming Minister of Science and Innovation sufficient information to meet initial requirements. It is not intended to be a detailed analysis of the portfolio or of policy issues.

The briefing is part of a wider process. You will be able to call for a fuller briefing on issues of interest and importance to you during that process. This allows the initial briefing to be wide ranging, enabling you to see the breadth of the portfolio, while still being concise.

Science and innovation lift the prosperity and well-being of New Zealanders

Science is the methodical generation and accumulation of knowledge. **Innovation** is the use of knowledge to find new or improved ways of doing something.

Science expands our knowledge base and helps us understand the world. It helps us answer particular questions and solve specific social, cultural, environmental, and economic challenges. Science and research-led teaching are central to education and growing a highly skilled workforce. And science gives us the evidence to make better decisions as a society. As a key ingredient for innovation, science also plays an important role in economic growth.

Innovation involves using knowledge and ideas to create new or improved products, processes, and services. Most innovation occurs within businesses as they look for ways to become more competitive. Innovation is pervasive; even low-technology businesses are constantly looking to improve their products and services or to do things more efficiently.

Businesses typically generate and apply science in the context of research and development (R&D). R&D is a core input to innovation. **R&D allows firms to produce new knowledge and apply existing knowledge in new ways.** It also allows firms to absorb ideas developed elsewhere, and is the learning process by which firms can adopt new technologies and adapt existing ones.

Innovation allows us to do more as a country while using the same or fewer resources. As we improve the way we do things and create more valuable products, our economy becomes more competitive, more productive, and it grows as a result. Through innovation our environment is managed more effectively, we become more resilient to natural and economic shocks, and ultimately people's well-being improves.

Introduction to the science and innovation system

The science and innovation system includes the interactions that occur in the production, sharing, and use of new knowledge. It includes businesses, researchers, research institutions, entrepreneurs, the Government (including ministries and local government), the relationships between them, and the relationships with these actors in other countries.

Government

Government has six roles in the science and innovation system. These are also central to your role as Minister of Science and Innovation. Government is:

- **A direction-setter.** Government's involvement in the science and innovation system creates significant influence over the direction of the system.
- **An owner** of parts of the system, most notably CRIs and some agencies.
- **A funder** of science and innovation activities.
- **A regulator.** Government does not directly regulate science and innovation activities, but its regulations have a strong impact on the system. For example, the granting of intellectual property rights creates a strong incentive to innovate.
- **A provider of information.** A lot of information on science and innovation is hard to collect and understand. Government has a role in collecting and sharing information to support good decision-making.
- **A user of science and innovation.** Governments rely on high-quality evidence provided by the science and innovation system to make good decisions. New technologies can help Governments provide better, more efficient services to New Zealanders.

Businesses

Businesses are investors in, producers of and users of science. They undertake 46 per cent of the R&D in New Zealand by expenditure. Businesses create value by undertaking, adopting and commercialising knowledge and research. Government supports businesses to innovate by providing funding and information. Slightly more scientists in New Zealand work in business than in research institutions.

Research institutions

Research institutions undertake R&D and related activities. The main research institutions in New Zealand are the eight universities, seven government bodies called Crown Research Institutes (CRIs), and a number of independent research organisations. Universities also provide education and training for the science and innovation workforce. Although slightly more full time researchers work in business than in research institutions, research institutions contain a large number of student researchers who make up a large part of New Zealand's research activity.

Infrastructure

Research facilities and technologies are needed for people to undertake scientific R&D and innovate successfully. Government sometimes invests directly in large-scale, costly scientific infrastructure.

International partnerships and interactions

New Zealand will only ever produce a small fraction of the world's research and innovation. International connections are important to bring new knowledge, ideas, people, technology and sources of funding into New Zealand, and for the export of innovations generated in New Zealand.

The New Zealand public

To benefit from the science and innovation system, the New Zealand public needs to be able to engage with, understand and apply the knowledge, products and services it generates.

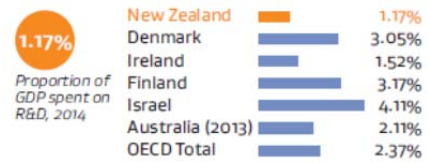
The current state of the science and innovation system

The recently published Science and Innovation System Performance Report sets out what we know about the performance of New Zealand's science and innovation system. A copy is attached to this briefing.

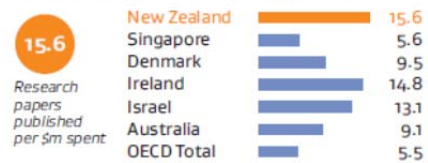
Key facts include:

- New Zealand's research sector is relatively small for the size of the economy, but efficient in terms of the amount of science done per dollar.
- On measures of standout 'very good' research papers, New Zealand produces more than the OECD average, but less than most other small advanced economies, suggesting there is still opportunity to improve.
- New Zealand has niche science expertise in Physics and Astronomy, Energy, Engineering and Computer Science.
- Total expenditure on R&D across the economy has grown significantly in real terms since 2000 (by around 75 per cent), driven by expenditure in the business sector.
- However, New Zealand firms still report relatively low levels of R&D and innovation in comparison to other countries.
- New Zealand has strong international science links – international collaboration is seen in over 50 per cent of research papers, and this is growing. Top collaborating partner countries are the US, Australia and the UK.
- We are successfully attracting scientists from overseas as permanent or long-term immigrants; we gain around 2,000 per year more than we lose. Highly internationally mobile researchers make a particularly high-quality contribution to New Zealand's research outputs.

Our science system is relatively small



Our science system is relatively productive



The Government's work programme aims to maximise the excellence and impact of science and innovation

The Government's key strategy for science is the *National Statement of Science Investment 2015-2025* (NSSI), and for innovation the *Building Innovation* chapter of the Business Growth Agenda. Copies of both documents are attached to this briefing.

The NSSI was launched in October 2015, following Cabinet approval. The NSSI vision for 2025 is:

"A highly dynamic science system that enriches New Zealand, making a more visible, measurable contribution to our productivity and wellbeing through excellent science."

The NSSI strategy guides the science work programme. It is built on two key pillars:

Excellence: we want our science to be some of the best in the world. Only excellent science will lead to the kinds of transformative changes to New Zealand's economy, environment and society that we need to see.

Impact: all of our science should have a strong line of sight to the eventual ‘real world’ effect it could have, even if that impact is many years in the future.

The NSSI also contains investment principles based on the role of Government as a funder of science. These principles are based on the likely distribution of benefits from investments in R&D. It is hard for an individual or a firm to ‘capture’ the benefits of R&D. If a firm pays for R&D, the knowledge produced will eventually become available to its competitors, removing that firm’s advantage. So firms tend to underinvest in R&D, even though such investment improves society through better products or services. It is government’s role to make up this gap.

This sometimes means government meets the full cost of science, where the potential benefits are very unclear but the possible uses for the science could be very broad, and could have a large impact on the whole of New Zealand. Where R&D is more easily used by a particular firm or sector (for example, research into dairy cattle will mostly benefit the dairy industry), Government should meet a lower proportion of the cost.

The last three years in Science and Innovation

Activities under the NSSI are in three broad areas:

- **Investment reform:** The bulk of science investments have been reviewed to bring them into line with the NSSI goals and design principles.
- **Performance information:** Performance information is critical to understanding the excellence and impact of the science system.
- **Growing investment:** As Government’s understanding of the performance of the system grows, it is able to grow high performing investments and target opportunities for New Zealand.

These broad themes represent a substantial change programme for the science and innovation sector. Over the last three years, the Minister of Science and Innovation has reviewed and reformed most of the major funding schemes to bring them into line with the goals and principles of the NSSI. The Endeavour Fund, Health Research Council (HRC), Strategic Science Investment Fund (SSIF), and Partnerships have all been brought into line with the NSSI, and work on the Marsden Fund is currently underway. Some new initiatives have been introduced, in particular the National Science Challenges and Regional Research Institutes (RRIs).

Government has also increased its investment through the large competitive funds (e.g. Endeavour Fund, Marsden Fund), and begun to create new specific investments, in areas such as fresh water and genomics, to deliver on the NSSI strategy.

Woven through these funding reforms and new investments is a performance focus, with Investment Plans describing what we seek, and the Domain Plan initiating a new way of gathering information about science. These changes are beginning to flow through into contract monitoring, where the clarity about what we want and the improved information, will provide the basis of more effective performance measurement.

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There is still substantial work to do. The challenges are now in implementing the reforms successfully to ensure the science and innovation sector responds to the NSSI as intended. Section 5 discusses future work in the Science and Innovation portfolio.

2. Portfolio Responsibilities

Your responsibilities

As Minister of Science and Innovation you have distinct yet complementary roles.

You have a number of statutory responsibilities as the Minister responsible for the Science and Innovation portfolio

You are responsible for several pieces of legislation, oversee the administration of science and innovation appropriations within Vote Business, Science and Innovation, and set the direction for the Ministry of Business, Innovation and Employment's (MBIE) science and innovation investment. As a shareholding Minister, you are also responsible for managing the Crown's interests in, and relationships with, a number of Crown entities.

You also have a leadership role for the science and innovation system

This role, while less defined, is nevertheless critical. Your unique position allows you to bridge gaps between individuals and groups in the science and innovation system and provide direction. You do this not only for those areas in which you are directly involved, but across all parts of the system where you have influence (but not necessarily direct control).

Although these roles are functionally separate, you engage in them in a way that supports the broader aims for New Zealand's science and innovation system. Working with other portfolios that invest in science and innovation, universities, research institutions, businesses, central and local government, and others is critical to fostering a dynamic science and innovation system that contributes to New Zealand's productivity and wellbeing.

Portfolio functions and responsibilities

Legislative responsibilities

As Minister of Science and Innovation, you have certain functions, duties and powers under several Acts of Parliament. These do not typically require your daily attention and we will brief you on them as needed. The Acts for which you are responsible are summarised below and your more significant functions, duties and powers are listed.

Research, Science and Technology Act 2010

This Act establishes the purposes for which the Government's research, science and technology funding may be allocated, as well as the processes for doing so.

Under this Act you are responsible for:

- Establishing and appointing members of the Science Board. The Science Board is responsible for making independent funding decisions on research, science, and technology.
- Setting criteria for the assessment of applications for funding. The Science Board must make funding decisions according to these criteria.

Some funding decisions are taken by the Science Board, and others are taken by you, MBIE, or other entities depending on the fund.

Crown Research Institutes Act 1992

CRIs are Crown-owned entities required to undertake scientific research of value to New Zealand. Annex One contains more information on the seven CRIs.

Under this Act the Minister of Finance and the Minister of Science and Innovation are shareholding Ministers responsible for the CRIs. The Minister of Science and Innovation generally takes the lead shareholder role, particularly as the formal point of contact with the CRI Boards. Your responsibilities as a shareholding Minister include:

- Appointing and dismissing directors.
- Overseeing the Government's ownership priorities and objectives.
- Approving any major transactions.
- Monitoring Board performance.

Callaghan Innovation Act 2012

This Act established Callaghan Innovation as a Crown entity with the aim of supporting science and technology-based innovation and its commercialisation by New Zealand businesses, in order to improve their growth and competitiveness. Annex One contains more information on Callaghan Innovation.

As the Minister responsible for Callaghan Innovation, your role includes the appointment of the Callaghan Innovation Board and monitoring Callaghan Innovation's performance.

Measurement Standards Act 1992

Through this Act, you provide for the use throughout New Zealand of uniform units of measurement of physical quantities, and for the establishment and maintenance of standards of measurement of physical quantities. The Measurement Standards Laboratory of New Zealand operates as a business unit of Callaghan Innovation, and is funded by a separate appropriation (National Measurement Standards) to perform the responsibilities outlined in the Act.

Building Research Levy Act 1969

This Act allows for a levy to be drawn from building and construction work payable to an industry organisation to fund building and construction research. You are the Minister responsible for the levy and may prescribe the rate of levy after consulting the Building Research Association of New Zealand Inc., which receives the levies prescribed under this Act.

Heavy Engineering Research Levy Act 1978

This Act allows for a levy to be drawn from producers and importers of steel goods payable to an industry organisation to fund heavy engineering research. You may prescribe the rate of levy after consulting the New Zealand Engineers' Federation. The Heavy Engineering Research Association receives these levies.

Wheat Industry Levies Act 1989

The Act allows for a levy to be drawn from wheat growers, flour millers, and purchasers of flour to be supplied to various industry organisations to fund research.

Crown entities

You are responsible for two further Crown entities, in addition to the CRIs and Callaghan Innovation.

Research and Education Advanced Network New Zealand Ltd (REANNZ)

REANNZ was formed in September 2005. Its purpose is to establish and operate a high-speed, unrestricted broadband network in order to promote education, research and innovation for the benefit of New Zealand.

As the lead shareholding Minister for REANNZ your responsibilities include Board appointments, setting expectations and objectives for REANNZ, and approving any major transactions.

Health Research Council of New Zealand

The HRC is responsible for managing the Government's investment in health research. While it is responsible to the Minister of Health, it has an output agreement with you for the funding it receives through Vote Business, Science and Innovation. You have a memorandum of understanding with the Minister of Health that provides for your joint governance of the HRC.

Statutory or advisory bodies

You have close relationships with a number of advisory bodies; the main ones are the Science Board, the Royal Society of New Zealand, and the Marsden Fund Council.

The Science Board

The Science Board is responsible for making independent funding decisions for the purposes of research, science, or technology. The Science Board typically meets monthly to make decisions on proposals for funding. You appoint the Board members and set the direction of investment under the Research, Science, and Technology Act 2010. The Science Board is responsible for making funding decisions for the Endeavour Fund, National Science Challenges, and Partnerships. Together these three funding schemes account for around a third of the funding you are responsible for.

The Royal Society of New Zealand

The Royal Society is an independent, non-government organisation that plays a critical role as New Zealand's academy of sciences. Its core purpose is the advancement and promotion of science, technology and the humanities in New Zealand. The Royal Society's broader functions include the provision of expert advice on important public issues to the Government and the community. The Royal Society also administers the Marsden Fund on your behalf.

The Marsden Fund Council

You are responsible for the Marsden Fund. The Marsden Fund is allocated by the Marsden Fund Council, which you appoint. The duties and responsibilities of the Marsden Fund Council are set in a Terms of Reference by the Minister of Science and Innovation. The Royal Society of New Zealand provides administrative support to the Marsden Fund Council.

Vote Business, Science and Innovation

You are responsible for science and innovation expenditure within Vote Business, Science and Innovation totalling (\$1,095 million in 2016/17). Annex 2 contains a full table of science and innovation expenditure.

Departmental output expenses (\$31 million) are MBIE's internal operating expenses. They enable MBIE to provide policy advice, monitoring and evaluation, and other services to the science and innovation sector.

Non-departmental output expenses (\$736 million) are spent by MBIE on your behalf to purchase a range of outputs from the science and innovation sector. They represent most of MBIE's science and innovation investment, and include MBIE's direct investment, strategic science investment funding provided to the CRIs, funding allocated on behalf of MBIE by the Royal Society of New Zealand (e.g. the Marsden Fund), and the HRC.

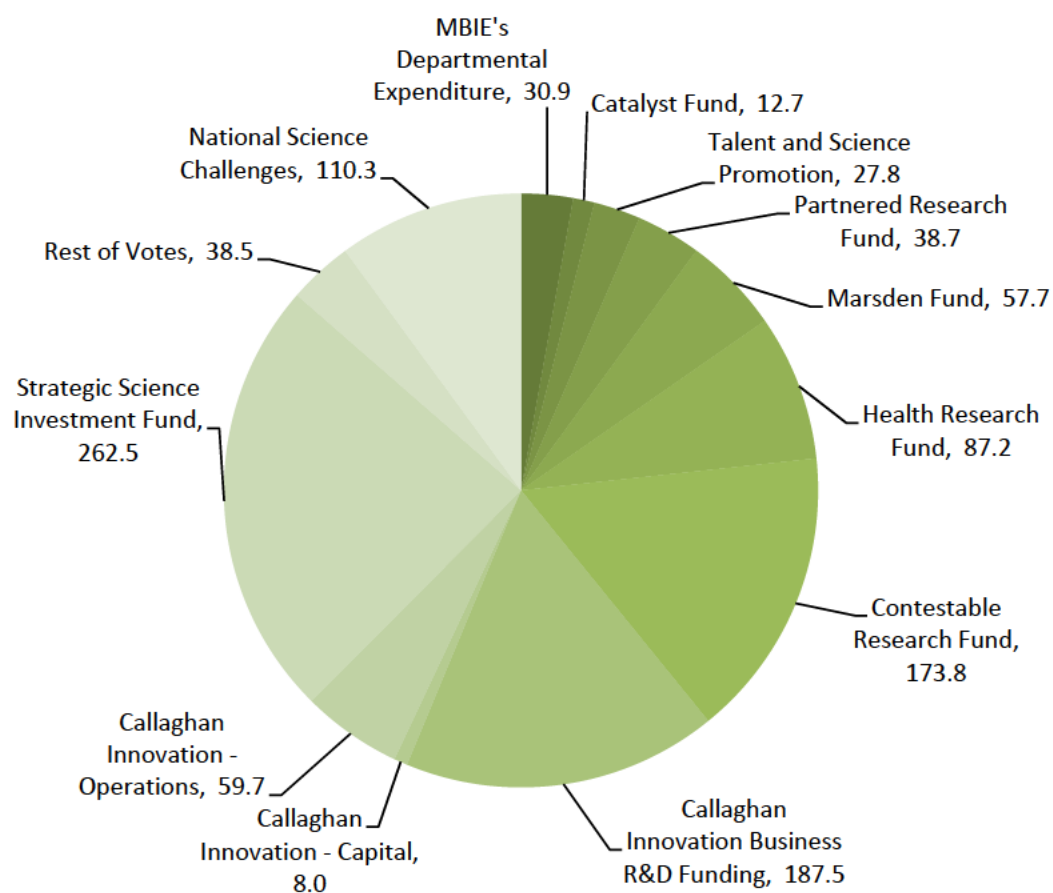
Non-departmental capital expenditure (\$8 million) consisting of a one-off capital investment to support the establishment and development of Callaghan Innovation (the 'Advanced Technology Institute' in Budget documents).

Non-departmental 'other expenses' (\$22 million) cannot be classified within other appropriation types. This includes funding provided to the Royal Society to support its core functions, and grants to promote international science partnerships.

Multi-year appropriations (\$298 million in 2016/17) are used when spending falls across two or more years (and no more than five years), but the timing of expenditure is uncertain. Vote Business, Science and Innovation currently has three multi-year appropriations for the National Science Challenges, R&D Growth Grants, and Targeted Business R&D Funding.

The annual Budget round is particularly important in this portfolio because expenditure is one of the main ways you influence the New Zealand science and innovation system. We would like to have an early conversation with you about your plans for Budget 2017.

Science and Innovation appropriations in 2016/17 (\$ million)



A summary of major science initiatives

Strategic Science Investment Fund

The SSIF supports longer-term, underpinning infrastructure and programmes of mission-led science critical to New Zealand's future. It was established in 2016 from a combination of existing funds and some new investment at Budget 2016. The SSIF Investment Plan 2017-2024, published in November 2016, sets out what the Government is seeking from this suite of investments.

The Fund is divided into SSIF Programmes and SSIF Infrastructure:

- SSIF Programmes (around \$200 million per year) funds long-term programmes of research. CRIs receive the bulk of this funding; these contracts are to be renewed on 1 July 2017, for a seven-year term.
- SSIF Infrastructure (around \$50 million per year) funds national research infrastructure platforms, including a research vessel, high performance computing, and Nationally Significant Collections and Databases.

Work is underway on a new investment in advanced genomics research, and to investigate potential investments in analysis and computation of big data, and Antarctica and the Southern Ocean.

National Science Challenges

The National Science Challenges are a set of eleven mission-led research programmes which aim to address issues of national significance to New Zealand over ten years. The Challenges provide an opportunity to align and focus New Zealand's research on large and complex issues by drawing scientists together from different institutions and disciplines. The Challenges are now mostly in their second or third year of operation, and are approaching a mid-point review in 2018.

Marsden Fund

The Marsden Fund invests in excellence-based research, to promote high-quality research capabilities in New Zealand. The Royal Society provides secretariat services for the Marsden Fund, and executive support to the Marsden Fund Council. You appoint the Marsden Fund Councillors.

The Marsden Fund was allocated \$58 million in 2016/17, rising to \$80 million in 2019/20 following new investment at Budget 2016. In light of this increased investment, a review of the Marsden Fund's Strategy and Management is underway (see Section 5 for information about the next steps on this project).

Endeavour Fund

The Endeavour Fund is one of the Government's main mission-led science investments. The Fund uses an annual competition to allocate funding to support research, science or technology with the potential to positively transform New Zealand's economic performance, the sustainability and integrity of our environment, help strengthen our society, and to give effect to the Vision Mātauranga policy. In 2017/18, a total of \$192 million will be invested through Endeavour.

The Health Research Council and health research strategy

You and the Minister of Health are jointly responsible for the efficient and effective functioning of the HRC. Responsibilities are set out in a Memorandum of Understanding between the two Ministers. The HRC is the Government's primary investor in health research in New Zealand, with funding rising to \$120 million per year in 2019/20.

A review of the HRC in 2015 found it is an important component of the science system and plays a valuable role. However, the review recommended a health research strategy be developed to set an agreed direction for health research, strengthen the health research and innovation system, and articulate responsibilities and opportunities. That strategy is currently in development (see Section 5 for information about the next steps on this project).

Regional Research Institutes

RRIs were a new investment at Budget 2015 (\$65 million over four years, ending in 2019/20). RRIs are to be new, private research organisations operating in the regions. They will stimulate leading edge, commercially focused, and industrially exploitable research.

MBIE is negotiating contracts with two new RRIs, to be in operation no later than July 2017:

- The New Zealand Institute of Viticulture and Oenology (NZRIVO) in Marlborough (up to \$12.5 million over four years).
- Centre for Space Science Technology (CSST) in Alexandra (up to \$17 million over four years).

A second funding round began in November (closing 27 January 2017). See Section 5 for information about the next steps on this project.

Vision Mātauranga policy

Through the Vision Mātauranga policy, we encourage appropriate and distinctive research arising from the interface between Māori knowledge and science to deliver effective and innovation products, services and outcomes for Māori and all New Zealand. This includes integrating the policy across government investments in research, and building the capability, capacity and networks of Māori and the research community to collaborate and carry out this work.

Vision Mātauranga was first introduced in 2005. Since then, there have been significant changes in the Māori economy, in settlements and the capacity of Māori organisations. During 2017 we will provide advice about options for refreshing Vision Mātauranga to reflect these changes.

Partnerships Scheme

The Partnerships Scheme supports high-quality research aimed at increasing the competitiveness and sustainability of New Zealand's economy (\$20-\$25 million per year). It strengthens ties between research organisations and research users, particularly industry, by supporting sectors to establish a long-term research programmes. It was recently reviewed and relaunched, and the first Investment Plan was published in November 2016.

International partnerships

International science and innovation connectivity is a key contributor to achieving the vision of NSSI, providing an opportunity to drive increasing excellence and the potential for impact of New Zealand science.

MBIE directly invests in international science partnerships through the Catalyst Fund. The Catalyst Fund supports activities that initiate, develop and foster collaborations leveraging international science and innovation for New Zealand's benefit (\$13 million in 2016/17).

MBIE is developing an International Science Strategic Action Plan, which will support the NSSI, providing clarity on the Government's expectations and priorities for international science engagement. MBIE is the lead department for the government's bilateral and multilateral science partnerships and responsibilities.

Kaikoura Earthquake Response and Recovery

The New Zealand science system is heavily involved in the response to and recovery activities associated with the M7.8 Earthquake near Kaikoura. The size of the affected area and complexity of this event means that science resources are stretched. Minister Joyce recently approved a funding transfer to support on-going earthquake science activities. See Section 5 for upcoming work.

Māori Digital Technology Development Fund

The Māori Digital Technology Development Fund is a \$30 million contestable fund established to support initiatives that will create high value jobs and opportunities for Māori in digital technologies. The fund will be spent over six years. The joint Ministers for the Fund are the Minister for Māori Development, the Minister for Science and Innovation and the Minister for Tertiary Education, Skills and Employment.

Te Puni Kōkiri (TPK) and the Ministry of Business, Innovation and Employment are jointly managing the Fund, with TPK in the lead role.

A summary of major innovation initiatives

Callaghan Innovation

Callaghan Innovation is a Crown entity established in February 2013 to support businesses to increase their investment in R&D. Its primary role is to assist firms in accessing the knowledge and research capability they need in order to succeed at innovation.

Callaghan Innovation receives four categories of funding: R&D grants, repayable grants for start-ups, capital expenditure, and operating expenditure.

Callaghan Innovation administers more than \$140 million per year of R&D grants:

- R&D Growth Grants (\$119 million in 2015/16) support investment in firms with a track record in R&D.
- Targeted Business R&D Funding (\$22.8 million in 2015/16) to support R&D investment in less-established businesses, and to fund internships in R&D-active firms.

They also administer Repayable Grants for Start-ups (\$11.0 million), which support business incubator and accelerator activities.

There is \$59.4 million of capital funding in Vote Business, Science and Innovation set aside to support Callaghan Innovation's establishment and ongoing development. Operational funding of \$64.5 million is also provided for Callaghan Innovation to run a range of capability building initiatives, and to deliver scientific and technical services for New Zealand firms.

Innovation hubs and precincts

Innovation hubs and precincts support place-based approaches, which are an important building block in a national innovation system. Opportunities for developing innovation hubs have been created by Callaghan Innovation and the CRIs because they need to replace substantial proportion of building stock within the next five years.

MBIE and the Crown Entities are involved in the development of major innovation precincts at Lincoln University; Gracefield, Wellington; Massey University, Palmerston North; and central Christchurch. We are gradually building on this work to consider broader regional innovation systems, and funding several regions, such as the Waikato and Canterbury, to develop their regional innovation landscapes. Smaller innovation hubs are being developed, including a forestry cluster based around Scion (a CRI) in Rotorua.

The Lincoln Hub is being created because AgResearch and Lincoln University need to replace buildings damaged or destroyed in the Christchurch earthquake. This has enabled a broader program of collaborative research, co-designed buildings, clustering with industry, and multi-national attraction across Lincoln University, three CRIs and Dairy NZ. A similar programme, FoodHQ, has been developed in Palmerston North.

In the next year, MBIE will be considering the Wellington footprint of Callaghan Innovation, ESR, GNS Science and NIWA and how they can coordinate and partner with universities, industry, local government and the District Health Board.

Square Kilometre Array

The Square Kilometre Array is an international project to construct the world's largest and most sensitive radio-telescope. Negotiations are underway to develop a treaty that would establish the Square Kilometre Array as an intergovernmental organisation. MBIE is representing New Zealand in these negotiations, which are expected to conclude in February 2017. Once the negotiations conclude the Government will need to take a decision on whether to participate in construction of the Square Kilometre Array.

Multinational R&D Attraction

New Zealand has low levels of business R&D funded from overseas relative to other small advanced economies. Multinationals play an important role in national innovation systems, by providing important connections to a wider global innovation system, and with them access to new markets, cutting edge technology, and capital. As part of the wider investment attraction strategy, in 2015 MBIE initiated a programme of work to attract multinational companies to perform R&D in New Zealand. The overarching approach of the programme is to work in partnership with other government agencies and entities across the science and innovation system to create compelling combinations of capability and support. Using this approach, a pipeline of 55 opportunities has been built, with 4 of those opportunities converting this year.

3. Major Links with Other Portfolios

The Government's total investment in science and innovation is currently over \$1.3 billion per year; this will rise to \$1.6 billion by 2019/20. Vote Business, Science and Innovation is the single largest source of government funding (\$1.1 billion in 2016/17). Vote Tertiary Education and Vote Primary Industries also make significant direct investments in science and innovation.

A number of other portfolios are involved in the science and innovation system. The major links between Science and Innovation and other portfolios are outlined in the table below.

Portfolio	Major links with science and innovation
Tertiary Education	<ul style="list-style-type: none"> Tertiary education invests in science and innovation through the Performance-Based Research Fund, allocated to tertiary institutions to encourage and reward research excellence (\$300 million per year by 2017); and the Centres of Research Excellence, to encourage high-quality tertiary research collaborations (\$50 million in 2016/17). Tertiary education also plays a major role in developing the science workforce and in knowledge transfer. Recent initiatives include ICT graduate schools and the Entrepreneurial Universities initiative. The Entrepreneurial Universities initiative seeks to strengthen the university system's capacity to conduct excellent science that has impact on industry innovation and commercialisation of research through the attraction of leading international academics.
Primary Industries	<ul style="list-style-type: none"> Vote Primary Industries invests in primary sector-led science and innovation, mainly through the Primary Growth Partnership (estimate: \$77 million in 2016/17). The PGP supports business-led and market-driven innovation programmes in the primary industries.
Health	<ul style="list-style-type: none"> The HRC receives most of its funding through Vote Business, Science and Innovation, although the Minister of Health is responsible for the entity itself.
Education	<ul style="list-style-type: none"> The Ministry of Education contributes to <i>A Nation of Curious Minds</i>, which aims to engage the New Zealand public with science.
Economic Development	<p>The Economic Development portfolio has a number of links with science and innovation, including:</p> <ul style="list-style-type: none"> The New Zealand Space Agency, which manages the regulatory regime for space and high-altitude activities New Zealand Trade and Enterprise, a Crown entity which engages closely with Callaghan Innovation to assist innovative New Zealand businesses Administering venture capital for high-growth businesses through the New Zealand Venture Investment Fund and Seed Co-investment Fund.

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Portfolio	Major links with science and innovation
Foreign Affairs and Trade	<ul style="list-style-type: none"> International science and innovation partnerships contribute to broader foreign policy goals. Science and innovation actions support New Zealand's strategies for a number of key international markets.
Māori Development	<ul style="list-style-type: none"> The Vision Mātauranga policy aims to unlock the science and innovation potential of Māori knowledge, people, and resources for the benefit of New Zealand. It is embedded across all science and innovation priority investment areas. <p>Te Pūnaha Hiringa: Māori Innovation Fund aims to grow the Māori asset base and increase Māori uptake of business support services. The Minister of Science and Innovation and Minister for Māori Development have joint governance of this Fund and the Minister for Māori Development is the appropriation Minister.</p>

4. How MBIE Assists You

Key MBIE officials

Responsibility for providing advice on Science and Innovation issues sits within the Ministry's Science, Skills and Innovation Group. Key contacts are set out in the table below:

Contact	Role	Priority Area	Contact details
David Smol	Chief Executive, MBIE	All	E david.smol@mbie.govt.nz P 04 901 1357 M s 9(2)(a)
Paul Stocks	Deputy Chief Executive, Labour, Science and Enterprise	All	E paul.stocks@mbie.govt.nz P 04 901 3893 M s 9(2)(a)
Peter Crabtree	General Manager, Science Innovation and International	Science and innovation policy	E peter.crabtree@mbie.govt.nz P 04 901 3907 M s 9(2)(a)
Prue Williams	General Manager, Science System Investment and Performance	Science investments	E prue.williams@mbie.govt.nz P 04 901 3939 M s 9(2)(a)
Michael Bird	General Manger, Evidence, Monitoring and Governance	CRI and Callaghan Innovation monitoring, Crown entity responsibilities	E michael.bird@mbie.govt.nz P 04 901 3929 M s 9(2)(a)

The advice and support we provide to you

MBIE provides a range of support and advice to you in your role as the Minister of Science and Innovation. This includes:

- **Science and innovation policy** as well as advice on the leadership and development of the science and innovation system.
- **Management of science and innovation appropriations** within Vote Business, Science and Innovation, including the planning and prioritisation of funding.
- **Crown entity ownership and monitoring** including commenting on draft statutory planning documents, developing and communicating the Government's ownership priorities and objectives for CRIs, and monitoring CRI performance.
- **International science and innovation partnerships** including advice on investments, the development of international partnerships, and the provision of support for your missions and international meetings.

5. Science and Innovation Work Programme

Focus for the first 100 days

The table below lists the major decisions and actions you are required to take in your first 100 days as the Minister of Science and Innovation. These cover the day-to-day operational requirements of your role – Board appointments, funding decisions, significant policy decisions, and other matters which require your immediate attention.

Topic	Description	Decision Required
<i>Policy Issues</i>		
Budget 2017	We will provide you with advice on options for investment at Budget 2017. The Budget round is particularly important for the S&I portfolio, because funding is one of the main levers for influencing the science and innovation system. We would like to have an early conversation with you about your plans for Budget 2017.	Engage with officials at your earliest convenience
Health Research Strategy	MBIE and Ministry of Health officials will shortly seek the approval of you and the Minister of Health to release a <i>Summary of Submissions and Consultation</i> . In early 2017, we will provide you with a draft strategy for consideration.	Approve the Health Research Strategy in early 2017
Marsden Fund Assessment	In light of additional investment at Budget 2016, MBIE has reviewed the Marsden Fund's strategy and management to ensure the Fund is making robust, fit-for-purpose investments. MBIE will provide you with the report and recommendations for summer reading.	Consider the findings of the report
National Science Challenge stakeholder survey	As part of managing the performance of the National Science Challenges, MBIE surveyed stakeholders about Challenge performance in 2016. MBIE will seek your agreement to run a further survey in 2017.	Agree to the launch
Kaikoura Earthquake	MBIE is funding additional scientific work required because of the Kaikoura Earthquake. We will advise you about the progress of this work, and any emerging issues, early in 2017.	Consider further advice in the New Year
Māori Digital Technology Development Fund	An Expert Advisory Group (EAG) was established to develop the Fund's operational framework, to assess proposals and provide recommendations to joint Ministers. The first round of applications opened in October 2016. The EAG is currently determining what proposals it will seek more information on. The EAG will provide recommendations and seek approval for joint Ministers for the first round of funding in March 2017.	
International Science Strategic Action Plan	MBIE is developing an International Science Strategic Action Plan to set out Government's expectations and priorities for international science engagement. Consultation on a draft Action Plan closed on 16 December 2016. Feedback received through consultation was on the whole very positive and constructive. We will provide you with a summary of submissions and recommendations for the final Action Plan in the New Year.	Approve a final Action Plan

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Strategic Science Investment Fund	We will renew investment in the CRIs through the SSIF in the middle of 2017. As part of that process, CRIs will submit proposals for the use of this investment ('platform plans') to MBIE before Christmas. In the New Year, we will provide you with our assessment of these plans.	Consider advice on CRI plans
Science, Research and Innovation Cooperation Agreement with Australia	New Zealand and Australia have developed a new Science, Research and Cooperation Agreement, to be signed by Prime Ministers in February 2017. We are working on a programme of cooperative activities to sit under the Agreement. This work programme will be completed by February 2017, to coincide with the Agreement signing.	Approve Work Programme
<i>System Governance</i>		
Marsden Fund Council	Three Marsden Fund Councillors' terms expired on 30 November 2016. s 9(2)(g) We will provide you with advice on this shortly, with the aim of seeking Cabinet decisions at the first APH Committee meeting in 2017.	Make Council appointments by the end of February 2017
Science Board appointments	The Science Board has five vacancies that need to be filled urgently so the Board can continue work early in 2017. We will provide you with advice on this shortly, with the aim of seeking Cabinet decisions at the first APH Committee meeting in 2017.	Make Board appointments by end of February 2017
Health Research Council	The Ministers of Health and former Minister of Science and Innovation received advice on future appointments to HRC but no decisions were reached. We will contact your office to discuss what further information you require on this matter.	Make Board appointments as soon as possible
<i>Crown entity responsibilities</i>		
Board appointments	Dr Richard Janes has resigned from the Board of Callaghan Innovation, effective 1 March. The Chairs of AgResearch, Landcare Research and NIWA have terms that expire in June 2017, as do 19 of 46 CRI and REANNZ directors. The Treasury, the secondary monitoring agency, leads this process because the skills required for this work are similar to those required in the State-Owned Enterprise portfolio.	Agree the appointment process to be followed early in the New Year
Annual Letters of Expectations	It is customary for you as the primary shareholding Minister to send an annual Letter of Expectations setting out key expectations such as improved financial performance, increased collaboration, and working to develop research hubs. These expectations are addressed in Statements of Intent and other public accountability documents.	Send letters of Expectations to Callaghan Innovation, the CRIs and REANNZ in early 2017

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<p>CRI significant transactions</p>	<p>In May 2016, shareholding Ministers advised Cabinet that they were endorsing AgResearch’s Future Footprint programme, a self-funded investment of \$133 million to develop research hubs in Lincoln and Palmerston North. Approval was conditional on:</p> <ul style="list-style-type: none"> • Ongoing Ministerial consultation on the Palmerston North co-investment with Massey University. Concept design is due December 2016. • The Better Business Case for co-investment in Lincoln s 9(2)(b)(ii) being accepted by Cabinet and the release of \$100 million capital funding for Lincoln University. Final business case is due January 2017. s 18(d), s 9(2)(b)(ii) <p align="center">s 9(2)(j)</p>	<p>s 9(2)(j)</p>
<p>REANNZ funding</p>	<p>REANNZ will be seeking agreement on its proposed strategy and financial sustainability during December 2016. REANNZ has been informed of the decision not to fund it through the SSIF as outlined in the SSIF Investment Plan approved by Cabinet in October.</p>	<p>s 9(2)(g)</p>
<p>Callaghan Innovation decisions</p>	<p>Early in 2017, Callaghan Innovation will seek your approval of its business plan to redevelop the Gracefield Innovation Quarter. \$59.4 million has been appropriated for this investment.</p> <p align="center">s 9(2)(b)(ii), s 9(2)(j)</p> <p align="center">s 9(2)(f)(iv)</p> <p align="center">s 9(2)(f)(iv)</p>	<p>Agree to accept and endorse business cases</p> <p align="center">s 9(2)(f)(iv)</p>

Beyond the first 100 days

Future challenges and opportunities

New Zealand's science and innovation system is small. Despite significant growth in recent years, New Zealand's investment in both public science and business innovation still lags behind international comparators.

The NSSI sets out the Government's ambition to create 'A highly dynamic science system that enriches New Zealand, making a more visible, measurable contribution to our productivity and wellbeing through excellent science.' As part of the NSSI vision, the Government reaffirmed its commitment to increasing public investment from to 0.8 per cent of GDP as fiscal conditions allow.

We also need to increase the level of business R&D to grow the economy. The Government's commitment to raising business expenditure on R&D to 1 per cent of GDP by 2018 is set out in the NSSI and BGA Innovation chapter.

A number of initiatives will go through crucial stages of development in 2017

In 2017, we are scheduled to commence, continue or complete implementation of several initiatives in the portfolio. This work programme is set out in the table below.

You will need to make decisions or seek agreement from your Cabinet colleagues on the implementation of these initiatives, including funding decisions, outcomes of reviews and decisions whether to proceed with implementation. We are also working on advice to support the Budget 2017 process.

We are ready to provide further advice on any of these areas should you request it. We would welcome the opportunity for an in-depth, strategic conversation on any of these issues at an early stage in your term in office.

Other policy advice you will need to consider

Topic	Description	Action Required
A Nation of Curious Minds	MBIE has conducted a review of elements of <i>A Nation of Curious Minds</i> . We will seek your feedback on our suggestions for improvements to some of the schemes under the plan.	Consider the results of the review in late 2016/early 2017
Regional Research Institutes	You and the Minister of Finance are the decision-makers for investments in new RRI's. The investment process for the second round of RRI's is currently underway. An expected timeframe for Ministerial decisions is June/July 2017.	Approve new RRI's
New SSIF platforms	Cabinet has agreed to make three new investments ^{s 9(2)(f)(iv)} through the SSIF, in an Advanced Genomics Research Platform, Big Data Analytics, and Antarctic Science. Although MBIE is the decision-maker for these new investments, we will seek your feedback on the kinds of investments we propose to make, and the process for doing so, during the first half of 2017.	Consider our advice on investments

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The Australian Synchrotron	The Australian Synchrotron is a particle accelerator that generates high-energy radiation used for medical and materials imaging. In return for a contribution of A\$1.5 million per year (funded from the SSIF and research organisations), New Zealand has 5% access to the Synchrotron. The Australian Synchrotron owner is developing a business case to expand the facility, and MBIE has \$6.5 million available for a potential capital contribution for that expansion.	MBIE will keep you informed of investment decisions
s 9(2)(f)(iv)	s 9(2)(f)(iv)	s 9(2)(f)(iv)
Measurement Standards Laboratory	Response to a review of the Measurement Standards Laboratory to be completed by March 2017.	Consider the findings of the review
Square Kilometre Array	Decide whether to ratify the Square Kilometre Array once negotiations are concluded in 2017.	Decide whether to ratify
Cooperation with Israel	We expect to conclude a Technology Cooperation Agreement with Israel in the first quarter of 2017.	Agree to the cooperation Agreement

International events

The following table sets out significant international science events coming up in the first quarter of 2017. We will advise you on each of these separately and provide you with a full set of proposals for international travel in 2017.

Important international considerations and events

Topic	Description	Decision Required
s 6(a)	s 6(a)	s 6(a)
Visit by Carlos Moedas, the European Union Commissioner for Research, Science and Innovation	Commissioner Moedas is expected to visit New Zealand in early March 2017. The EU sets the agenda to a significant degree for European and global research. Europe is New Zealand's leading regional partner in science. The European Commission has a budget of €70 million for its current seven year-long research programme, Horizon 2020.	Agree to participate in relevant elements of the visit

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s 6(a)	s 6(a)	s 6(a)
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Annex 1: Crown Entities

Crown Research Institutes

CRIs are Crown-owned companies that undertake scientific research for the benefit of New Zealand. Each of the seven CRIs is aligned with a productive sector of the economy or a grouping of natural resources.

CRIs are also partner investors in science and innovation alongside MBIE, and they are some of New Zealand's most significant producers of science and technology. The seven CRIs are:

AgResearch Limited – AgResearch's purpose is to enhance the value, productivity, and profitability of New Zealand's pastoral, agri-food, and agri-technology sectors.

The Institute of Environmental Science and Research Limited (ESR) - ESR's purpose is to deliver enhanced scientific and research services to the public health, food safety, security and justice systems, and the environment sector.

The Institute of Geological and Nuclear Sciences Limited (GNS Science) – GNS Science's purpose is to undertake research that drives innovation and economic growth in New Zealand's geologically based energy and minerals industries, and to improve understanding of geological processes and hazards.

Manaaki Whenua Landcare Research New Zealand Ltd (Landcare Research) – Landcare Research's purpose is to drive innovation New Zealand's management of terrestrial biodiversity and land resources, in order to both protect and enhance the terrestrial environment.

The National Institute of Water and Atmospheric Research (NIWA) – NIWA's purpose is to enhance the economic value and sustainable management of New Zealand's aquatic resources and environments, and to improve understanding and prediction of climate and weather hazards.

The New Zealand Institute for Plant and Food Research Limited (Plant and Food Research) – Plant and Food Research's purpose is to enhance the value, productivity and sustainability of New Zealand's horticultural, arable, seafood, and food and beverage industries.

The New Zealand Forest Research Institute Limited (Scion) – Scion's purpose is to drive innovation and growth from New Zealand's forestry, wood products, wood-derived materials, and other biomaterials.

Callaghan Innovation

Callaghan Innovation is a Crown entity, established on 1 February 2013. Its purpose is to accelerate the commercialisation of innovation by New Zealand businesses. It is a business-facing organisation which carries out a new role in New Zealand's science and innovation system.

Callaghan Innovation works across the science and innovation system to help translate scientific knowledge into economic value. It provides a number of services to businesses:

- Providing research and technical services to support near-to-market innovation by firms, and acting as an intermediary to help link firms to the commercialisation of services and funding.
- Administering and awarding R&D grants to firms.

- Managing the business incubator and business accelerator programmes.
- Supporting and coordinating the National Technology Networks.
- Helping firms acquire the skills and expertise needed to successfully take ideas to market.

The Health Research Council of New Zealand

The HRC is the Government's primary funder for research funds specifically targeted at health research. The HRC supports research that has the potential to improve health outcomes and the delivery of healthcare, and to produce economic gain for New Zealand.

The HRC receives funding through Vote Business, Science and Innovation's Health and Society appropriation. In 2015/16 this totalled \$77 million. Funding will increase to \$120 million in 2019/20. The HRC currently invests in the following research areas:

- Maintaining health and wellbeing throughout the life course of New Zealanders.
- Building an evidence base that contributes to Māori health gains.
- Improving outcomes for acute and chronic conditions in New Zealand.
- Supporting innovation and improvement in health service delivery and planning.

You and the Minister of Health are jointly responsible for the efficient and effective functioning of the HRC. A Memorandum of Understanding sets out the responsibilities for both Ministers. The Minister of Science and Innovation has a responsibility to ensure the HRC is part of a cohesive science and innovation system, that HRC funding aligns with other investments in the science system, and that the economic and scientific benefits of health research are captured. You negotiate an output agreement for Vote Business, Science and Innovation funding with the Chair of the HRC and monitor the performance of the HRC with respect to the agreement.

Research and Education Advanced Network New Zealand Ltd (REANNZ)

REANNZ provides a high-performance computing network to promote research, education and innovation for the benefit of New Zealand. It was formed in September 2005 under the Companies Act 1993 and is listed under schedule 4 of the Public Finance Act 1989.

REANNZ's members include New Zealand's universities, CRIs, institutes of technology and polytechnics, and other entities in the research, education and innovation community.

As the lead shareholding Minister for REANNZ your responsibilities include:

- Appointing its Board and monitoring Board performance.
- Approving the annual Statement of Intent and Letter of Expectations, which sets the Government's priorities and objectives for REANNZ.
- Approving any major transactions.

Annex 2: Vote Science and Innovation as at 2016 October Baseline Update

	Jun 2017	Jun 2018	Jun 2019	Jun 2020	Jun 2021
	(\$000)	(\$000)	(\$000)	(\$000)	(\$000)
VOTE: BUSINESS, SCIENCE AND INNOVATION					
Non-Departmental Output Expenses					
National Science Challenges	-	-	73,466	79,153	79,153
National Science Challenges (MYA Expense)	110,290	102,845	-	-	-
Research and Development Growth Grants (MYA Expense)	140,339	-	-	-	-
Research and Development Growth Grants	-	145,680	145,633	145,633	145,633
S&I: Contestable Research Fund	173,841	192,001	198,715	205,517	200,428
S&I: Health Research Fund	87,175	95,175	103,175	120,175	120,175
S&I: Marsden Fund	57,755	63,755	71,755	79,755	79,755
S&I: National Measurement Standards	5,764	5,764	5,764	5,764	5,764
S&I: Partnered Research Fund	38,662	37,161	37,161	37,161	37,161
S&I: Repayable Grants for Start-Ups	16,996	13,996	13,996	13,996	13,996
Targeted Business Research and Development Funding (MYA Expense)	47,196	-	-	-	-
Targeted Business Research and Development Funding	-	37,500	37,500	37,500	37,500
Total Non-Departmental Output Expenses	678,018	693,877	687,165	724,654	719,565
Non-Departmental Other Expenses					
S&I: Catalyst Fund	12,675	11,851	14,351	14,351	14,351
S&I: Maori Innovation Fund	4,536	3,000	3,000	3,000	3,000
S&I: Regional Research Institutes	5,000	20,000	20,000	20,000	-
Total Non-Departmental Other Expenses	22,211	34,851	37,351	37,351	17,351
Non-Departmental Capital Expenditure					
S&I: Callaghan Innovation	8,000	10,000	20,000	21,410	-
Total Non-Departmental Capital Expenditure	8,000	10,000	20,000	21,410	-
Multi-Category Expenses and Capital Expenditure					
Policy Advice and Related Outputs MCA					
Departmental Output Expenses					
- Policy Advice - Science and Innovation	7,348	5,148	5,148	5,148	5,148
- Related Services to Ministers - Science and Innovation	2,608	2,608	2,608	2,608	2,608
S&I: Talent and Science Promotion MCA					
Non-Departmental Output Expenses					
- Fellowships for Excellence	11,570	11,570	11,570	11,570	11,570
- Science in Society	9,791	8,849	8,849	8,849	8,849
- Vision Mātauranga Capability Fund	5,967	5,967	5,967	5,967	5,967
Non-Departmental Other Expenses					
- Royal Society of New Zealand	500	500	500	500	500
S&I: Strategic Investment Fund MCA					
Non-Departmental Output Expenses					
- Strategic Investment Fund - Infrastructure	63,798	46,759	44,859	46,859	46,859

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	Jun 2017	Jun 2018	Jun 2019	Jun 2020	Jun 2021
	(\$000)	(\$000)	(\$000)	(\$000)	(\$000)
- <i>Strategic Investment Fund - Programmes</i>	198,724	198,724	204,224	202,224	202,224
S&I: Callaghan Innovation - Operations MCA					
Non-Departmental Output Expenses					
- <i>Building Business Innovation</i>	32,378	32,378	32,378	32,378	32,378
- <i>Business Research and Development Contract Management</i>	7,750	7,750	7,750	7,750	7,750
- <i>Research and Development Services and Facilities for Business and Industry</i>	19,523	19,523	19,523	19,523	19,523
S&I: Contract Management MCA					
Departmental Output Expenses					
- <i>Science and Innovation Contract Management</i>	20,945	19,763	19,120	18,440	18,440
Non-Departmental Output Expenses					
- <i>Research Contract Management</i>	6,227	6,227	6,227	6,227	6,227
Total Multi-Category Expenses and Capital Expenditure	387,129	365,766	368,723	368,043	368,043
Total Annual and MYA Expenses	1,095,358	1,104,494	1,113,239	1,151,458	1,104,959