



## COVERSHEET

<b>Minister</b>	Hon Dr Megan Woods	<b>Portfolio</b>	Research, Science and Innovation
<b>Title of Cabinet paper</b>	Future Pathways for the Research, Science and Innovation System; and Future Pathways for the Research, Science and Innovation System: Release of discussion document	<b>Date to be published</b>	28 October 2021

### List of documents that have been proactively released

<b>Date</b>	<b>Title</b>	<b>Author</b>
May 2021	Future Pathways for the Research, Science and Innovation System	Office of the Minister of Research, Science and Innovation
19 May 2021	Future Pathways for the Research, Science and Innovation System DEV-21-MIN-0099 Minute	Cabinet Office
September 2021	Future Pathways for the Research, Science and Innovation System: Release of discussion document	Office of the Minister of Research, Science and Innovation
29 September 2021	Future Pathways for the Research, Science and Innovation System: Release of discussion document DEV-21-MIN-0193 Minute	Cabinet office

### Information redacted

**NO**

Any information redacted in this document is redacted in accordance with MBIE's policy on Proactive Release and is labelled with the reason for redaction. This may include information that would be redacted if this information was requested under Official Information Act 1982. Where this is the case, the reasons for withholding information are listed below. Where information has been withheld, no public interest has been identified that would outweigh the reasons for withholding it.

**[Sensitive]**

Office of the Minister of Research, Science and Innovation

Cabinet Economic Development Committee

## **Future pathways for the Research, Science and Innovation System**

### **Proposal**

- 1 This paper seeks Cabinet agreement to begin a programme of work on future pathways for our Research, Science and Innovation (RSI) system.

### **Relation to government priorities**

- 2 RSI has a vital role in supporting the delivery of government priorities in all areas to build an inclusive, sustainable and productive future. This includes environmental challenges, transforming the built environment and sectors of our economy, and underpinning our ability to respond to increasing threats to resilience, human health and well-being.

### **Executive Summary**

- 3 Meeting the challenges and opportunities of the future will require harnessing the collective capability of our Research, Science and Innovation (RSI) system, to tackle the complex and interdependent challenges that are central to New Zealand's future. These include:
  - Intractable environmental challenges such as combating climate change and biodiversity loss, and sustainable and efficient water and land use, that require a multidisciplinary and collaborative approach;
  - Generating sustained improvements to our health and wellbeing;
  - Responding to government priorities in areas such as transforming our built environment to alleviate the housing crisis, and energy transitions to meet our future needs; and
  - Leveraging future economic opportunities in a rapidly changing world to support our recovery from COVID-19 and shape a future economy that is more productive, resilient and diverse. This includes supporting the transformation of traditional sectors in our economy (e.g. diversifying and adding value in food and fibre), and supporting the growth of knowledge intensive industries (e.g. aerospace, advanced manufacturing and medical technologies).
- 4 Our RSI system is not well configured to meet these challenges and opportunities. In the last term of Government, we took a first significant step to address a major part of this problem by introducing our R&D Tax Incentive. Over the coming years, we

expect that the Tax Incentive will be transformative to our levels of business-driven R&D.

- 5 We must now consider some aspects of our research system which are not working well. The ‘public’ research system – those parts funded mainly or owned by Government - is characterised by a significant amount of fragmentation. There is a lack of role clarity for institutions, unproductive competition between institutions, and a lack of integration between our universities, CRIs and other parts of the research system. Individually, our researchers and research organisations continue to produce excellent research. However, the system does not enable a collective contribution to our long-term challenges.
- 6 We have also seen difficulties in our system adapting to changing national need and building capabilities necessary for future transformation and resilience. There is a proliferation of governance, and a large number of competing strategies and priorities which struggle to be given effect.
- 7 Many of these problems have been highlighted in recent times by reviews and reports including: the Te Pae Kahurangi report on the collective contribution of CRIs; the Parliamentary Commissioner for the Environment’s (PCE) review of funding and prioritisation of environmental research in New Zealand; the Productivity Commission’s inquiry into ‘frontier firms’; the Office of the Prime Minister’s Chief Science Advisor’s (PMCSA) report on the Future of Commercial Fisheries; and the Te Pūtahitanga report.
- 8 We must strengthen the role of Māori in the system and consider how the system achieves outcomes for Māori. We need to reimagine obligations and opportunities for Te Tiriti in our RSI system, better enabling Mātauranga Māori and the interface between mātauranga and science.
- 9 Government has made a number of reforms to the RSI system over the past ten years, seeking to shift the system from a sectoral focus to one that emphasises impact, research excellence, and connections. These reforms have sharpened the system’s focus on excellence and impact, but have in some cases added increased complexity, cut across existing accountabilities, and added to the cost of collaboration.
- 10 It is now clear that more fundamental changes are necessary to address connectivity, fragmentation, and responsiveness to priorities. We are still missing the means to give genuine effect to cross-cutting national research priorities, such as climate change, fresh water management, and post-COVID economic recovery.
- 11 If we do not address these issues, our current system will not deliver for the future state and meet New Zealand’s research needs. The future state for our RSI system needs to be one that is adaptable for the future, resilient to changes and connected; to itself, to industry, to public sector users of research, and internationally.
- 12 The Minister of Education will also be taking a paper to Cabinet shortly on proposed changes to the Performance Based Research Fund (PBRF) which aligns with the work in this portfolio to strengthen the RSI system.

- 13 As outlined above, there is a compelling case for change. I therefore propose a large-scale work programme to deliver that change with a focus on:
- Giving the system priorities that focus what we do and ensuring that complex challenges such as climate change have a clear locus of activity and dedicated resourcing.
  - Reshaping the funding system to be able to give effect to those priorities, as well as building our capability needs now and into the future.
  - Shaping our institutions in a way that they are able to give effect to those priorities and be adaptable in a fast changing world.
- 14 Collectively, these proposals could represent the most significant reform to our public research system since the creation of the CRIs in the early 90s. However, I intend the process to be inclusive and deliberative, and we will have further opportunities to consider the level of change and the extent to which the costs of change will be commensurate with the expected benefits.

## **Background**

*Innovation and Research are vital to addressing the challenges and opportunities of the future*

- 15 Meeting the challenges and opportunities of the future will require harnessing the collective capability of our Research, Science and Innovation (RSI) system, to tackle the complex and interdependent challenges that are central to New Zealand's future. These include:
- Intractable environmental challenges such as combating climate change and biodiversity loss, and sustainable and efficient water and land use, that require a multidisciplinary and collaborative approach;
  - Generating sustained improvements to our health and wellbeing;
  - Responding to government priorities in areas such as transforming our built environment to alleviate the housing crisis, and energy transitions to meet our future needs; and
  - Leveraging future economic opportunities in a rapidly changing world to support our recovery from COVID-19 and shape a future economy that is more productive, resilient and diverse. This includes supporting the transformation of traditional sectors in our economy (e.g. diversifying and adding value in food and fibre), and supporting the growth of knowledge intensive industries (e.g. aerospace, advanced manufacturing and medical technologies).
- 16 Critical to success in all of these areas is innovation. Innovation is the structured exploration of new ways of doing things, and is a concept that applies equally to businesses and the public sector. Transformative innovation most often takes new knowledge as an input. In some of our areas of challenge, such as environmental monitoring, much progress could be made by extending existing knowledge. But even

in these areas, in addition to this necessary extension, transformative innovation offers the promise of better, more cost effective, and more comprehensive information and analysis.

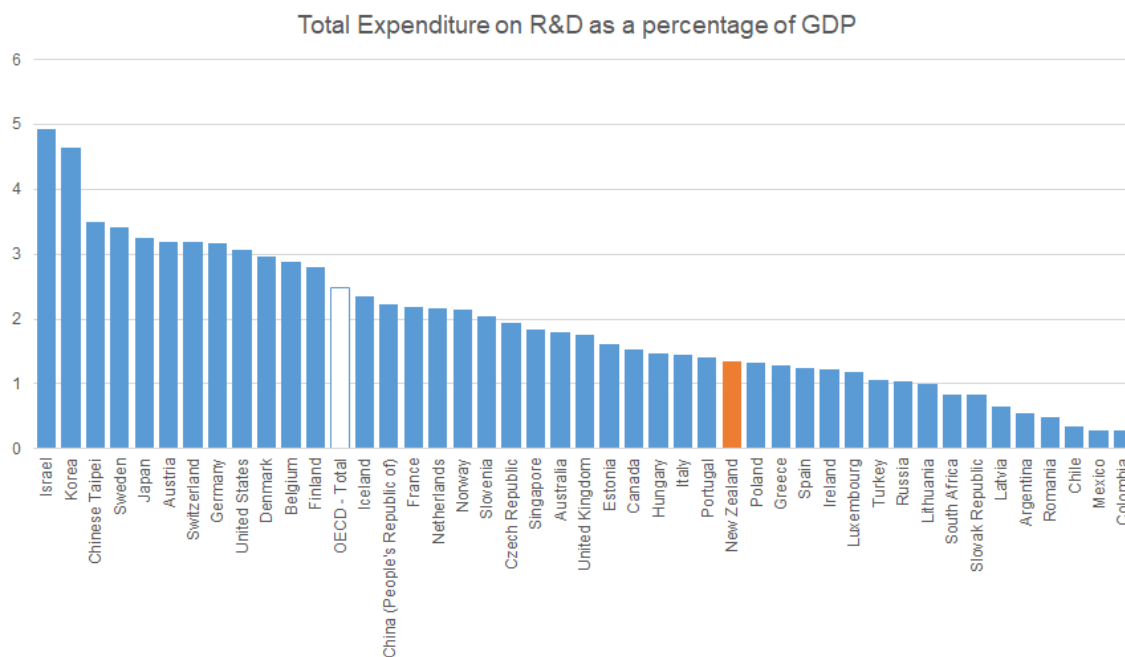
*Innovation and research take place within a global knowledge production system*

- 17 New Zealand produces only 0.3% of the world's scientific publications. Yet successfully tackling New Zealand's challenges is reliant on combining multiple pieces of knowledge into new innovations that can be applied to them. New Zealand cannot expect to generate all the knowledge required to solve any particular problem, and therefore it is vital that our science system has rich connections to international science and innovation leaders. Our RSI system needs to be able to both compete and collaborate effectively within this global system.
- 18 Our place in this global system must also recognise those things which are unique about New Zealand, or where we have opportunities and challenges that are specific to our context. The relationship founded on Te Tiriti is one of the most significant of these areas. Our work needs to include reimagining obligations and opportunities for Te Tiriti in our RSI system, better enabling Mātauranga Māori and the interface between mātauranga and science.
- 19 The RSI system, when working well, forms a critical nexus where new knowledge is translated into new services, interventions, and technologies. National science and innovation systems contribute to prosperity and well-being by generating new knowledge and new ways of doing things. They also enhance access and use of knowledge and innovation created internationally.
- 20 While there are many opportunities for NZ to benefit from the global science and innovation system, there are some national security risks of an increasingly globalised environment that will need to be monitored and accounted for when considering reforms to this sector. New Zealand will need to balance opportunities with national security risks when engaging with the global RSI community. This is especially the case when considering sensitive research.

*New Zealand does not research or innovate enough*

- 21 Despite the importance of RSI to New Zealand's future, we do not undertake as much research or innovation activity as we should. Both our business research and development (R&D) and Government R&D expenditure as a proportion of Gross Domestic Product (GDP) are low by global standards. This means that we are not devoting enough of our collective resources to addressing the challenges of the future. For this reason, we have adopted a goal of raising the proportion of our GDP we spend on R&D from its current level of around 1.5 per cent to 2 per cent of GDP by 2027.

Figure 1: Total expenditure on R&D as a percentage of GDP



- 22 The Productivity Commission’s recent report ‘New Zealand Firms – reaching for the frontier’ set out a number of problems and opportunities for our national prosperity.
- 23 The report notes that New Zealand’s disappointing productivity performance has held back its standard of living, and wellbeing more generally, for many years. It also notes that ‘frontier’ firms have a critical role to play. These world-leading firms can have a transformative impact on economies, and are often characterised by close links with RSI systems; they are R&D intensive, rely heavily on new knowledge, and innovate consistently.
- 24 The report notes that while New Zealand does have some world-leading firms, it does not have enough of them. World-leading firms in other successful economies are also more productive than those in New Zealand and are closer to the global frontier. The Commission reports that New Zealand’s innovation ecosystems are not currently working well for actual and potential frontier firms. For example, the links between firms and public research institutions are mostly poor, and our research system does not focus sufficiently on specialised, distinctive knowledge areas that would develop and grow such firms.
- 25 Other developed economies take these problems and opportunities seriously, and are investing at a scale that far outstrips our own, even when our relatively small size is taken into account.

*Both business and Government play major roles in our RSI system*

- 26 Around 55 per cent of New Zealand’s research happens in businesses. The remaining 45 per cent is financed from Government sources. The Crown also owns our biggest public research organisations – the CRIs and universities. Callaghan Innovation also

houses a relatively large research function as part of its R&D Solutions division. Investments administered by MBIE alone fund over 25 per cent of the research that happens in New Zealand, not including the R&D Tax Incentive.

- 27 New Zealand's public research is undertaken by a diverse range of entities including CRIs, Callaghan Innovation, tertiary education institutions (universities, wānanga, and Te Pūkenga – the New Zealand Institute of Skills and Technology), independent research organisations, national and local Government bodies, Māori and iwi groups, industry bodies, and businesses, including via Government Industry Agreements. Despite this diversity of entities, the vast majority of public research takes place in CRIs and universities, with other entities performing substantially smaller amounts of research.

### **Reforms to our RSI system**

*In the last term of Government, we introduced the R&D Tax Incentive to raise business expenditure on R&D*

- 28 In the last term of Government, we took a first significant step to address our low levels of R&D investment by introducing our R&D Tax Incentive. Over the coming years, we expect that the Tax Incentive will be transformative to our levels of business-driven innovation.
- 29 We now need to turn our attention to our public research system, and ensure it is set up for success in terms of supporting transformative innovation to address our major challenges and opportunities.

*Our public research system was designed in the 1990s according to the prevailing challenges and ideas of the time*

- 30 The basic building blocks of our research system were designed in the early 1990s, and given effect through the creation of the CRIs from a number of predecessor organisations, most significantly the Department of Scientific and Industrial Research (DSIR). This system design is heavily weighted towards classic microeconomic structures, focused on market values and mechanisms (e.g. competition and contestability), and commercial discipline. Key parts of the system were also designed specifically for an economy focused on sectors that extracted value from food and fibre.

*Since the early 1990s, University contribution to research has grown significantly*

- 31 In 1990, university research in New Zealand was around two thirds of research conducted in CRIs or their predecessor organisations. Over the past 30 years, in line with global trends, that balance has shifted, with universities accounting for a greater share of public research than Government organisations – 25 per cent in Universities versus 20 per cent in mostly CRIs. The system designed in the 1990s was not designed with this shift in mind, instead assuming that the weight of research of importance to New Zealand would need to occur in Government organisations. The legacy of this is something that looks in some ways like two separate research systems, creating further soft and hard barriers to connections. We need to address these barriers.

*Successive governments have made key shifts to this system over the last ten years*

- 32 Governments have made a number of reforms to the RSI system over the past ten years to shift the system from a sectoral focus to one that emphasises impact, excellence and connections, and one that recognises that research platforms (such as data science and genomics) serve a myriad of sectors.
- 33 A key milestone was the CRI Taskforce in 2010, which provided a set of recommendations focussed on shifting CRIs from profit-seeking businesses to public research entities, and ensuring connection rather than institutional competition was the key mode of operation.
- 34 The more significant reforms following the CRI Taskforce report are detailed below.
  - 34.1 Following the CRI Taskforce in 2010, Government made changes to CRI operations to improve role clarity, and to simplify and stabilise funding for CRIs. It achieved this through the creation of Statements of Core Purposes for CRIs, establishment of CRI Core Funding, and governance and strategy changes to CRIs to clarify expectations that CRIs would operate as public good research organisations rather than businesses.
  - 34.2 Callaghan Innovation was created in 2012 (including the amalgamation of Industrial Research Ltd, with some capability moved to universities), building on advice on the innovation system delivered in the Powering Innovation report from 2011. New R&D support mechanisms were introduced in parallel, notably Growth Grants and Project Grants.
  - 34.3 The National Science Challenges were introduced in 2014. The Challenge Programme has a core policy objective of encouraging collaboration across the RSI system, bringing together multi-disciplinary teams from all of New Zealand's research institutions. CRIs participate in Challenges as both hosts and research providers.
  - 34.4 The Endeavour Fund was introduced in 2015, consolidating six individual research funds into a single contestable fund. This reduced complexity, established a funding avenue for open competition for transformative new ideas, and enabled more predictable financial management of contestable funds. It established a large open competition, moving away from the previous practice of setting detailed research topics for each investment round.
  - 34.5 The Strategic Science Investment Fund (SSIF) was operationalised in 2017, following a review of CRI Core Funding. It acts as a counterpart to Endeavour and other competitive funding mechanisms by allowing Government to directly purchase research of strategic importance.
  - 34.6 In parallel, centrally held research infrastructure investments were consolidated under the SSIF Infrastructure investment mechanism.
- 35 While the aims of the reforms have been relatively consistent, in particular around increasing connections in the system, and providing Government with the ability to give effect to strategy, their effect has been variable. The reforms have sharpened the



system's focus on excellence and impact, encouraged increased collaboration between researchers, and improved the transparency of our collective research investment.

- 36 However, in some cases they have added increased complexity, cut across existing accountabilities, and added to the cost of collaboration. Too little progress has been made on a system which is inclusive of, and responsive to Māori. And it remains challenging for Government to give clear effect to strategies, as the funding system is not tied specifically to the delivery of those strategies. We have a much better idea of where RSI investment is going, but there are insufficient links between that investment and our objectives. It is clear that we need to take further steps to reform the system.
- 37 Several recent reviews and reports have highlighted the fragmentation within the system and the difficulties we face in 'driving' or directing the system towards specific problems or outcomes. These include:
- 37.1 Te Pae Kahurangi, which undertook a collective review of our Crown Research Institutes (CRIs) and proposed a series of recommendations to position our CRIs to meet New Zealand's current and future needs.
- 37.2 The Parliamentary Commissioner for the Environment's (PCE) review of funding and prioritisation of environmental research in New Zealand which found the way we invest in environmental research is fragmented, making it hard to respond to long-term environmental problems such as climate change, freshwater quality and biodiversity loss.
- 37.3 The Productivity Commission's inquiry into 'frontier firms' which highlights the importance of innovation to lifting our productivity.

## **Recent engagement on the research system**

*Work in the last term of Government showed that connections were still a problem in the RSI system*

- 38 During the last term of Government, MBIE led the development of a refreshed RSI Strategy, with two rounds of extensive public consultation occurring in 2018 and 2019 prior to the COVID-19 pandemic.
- 39 These rounds of consultation revealed overwhelmingly that our system suffered from weak connectivity. Researchers found it challenging to connect with researchers from different organisations; research organisations found it hard to connect with each other; businesses found it challenging to engage productively with the public research sector, and data showed that our RSI system continues to struggle to connect effectively internationally.
- 40 In addition, responsiveness to Māori was noted to be weak, and models of engagement poor. Stakeholders noted there was much to be done to improve the way the system interacts with Māori at multiple levels. This is similar to feedback we received during engagement on the Health Research Strategy.
- 41 We know that more work needs to be done to explore how the RSI system will seek to understand and respond to Te Tiriti o Waitangi/Treaty of Waitangi (Te Tiriti)

obligations and opportunities. We know that there is a diverse range of stakeholders in the RSI system including Māori researchers, Māori businesses, iwi, hapū, and other Māori users of research. We need to build relationships and partnerships for the long term as we develop proposals for any future changes.

*In 2020, MBIE commissioned an independent review of CRIs' collective contribution*

- 42 In 2020, MBIE commissioned an independent review of the CRIs' collective contribution to New Zealand – Te Pae Kahurangi. The review was undertaken by a panel of senior researchers and research system leaders, and was chaired by David Smol, former Chief Executive of MBIE.
- 43 The review echoed many of the themes of the RSI Strategy consultation. It found that there is a lack of role clarity for institutions, unproductive competition between institutions, and a lack of integration between our universities, CRIs and other parts of the research system. It repeated the findings from the RSI Strategy about the weak responsiveness of the system to Māori.
- 44 Te Pae Kahurangi also noted difficulties in our system adapting to changing national need and building capabilities necessary for future resilience and transformation. It found a proliferation of governance, and a large number of competing strategies and priorities which struggle to be given effect.

*I agree with Te Pae Kahurangi's overall assessment, and consider many of the findings apply to the whole of the public research system.*

- 45 I agree that overall, our 'public' research system – those parts funded mainly or owned by Government - is characterised by a significant amount of fragmentation. Individually, our researchers and research organisations continue to produce excellent research. However, the system does not work as well as it should to enable a collective contribution to our long-term challenges.
- 46 The problems noted in these recent pieces of work are similar to those which have been canvassed repeatedly over the last ten years. Successive Governments have made a variety of changes to our system to improve connectivity, reduce fragmentation, improve responsiveness, and establish a clear line of sight whereby our research system contributes clearly and effectively to national goals and challenges.
- 47 While these reforms have often been successful within their scope, collectively they have not led to the system-level transformation we need. I am therefore persuaded that we should establish a programme of work to consider more fundamental and wide-ranging reforms to our research system, to make it fit for purpose for the future.

## **Future Pathways – a work programme to establish a connected, adaptive and resilient research system**

- 48 I propose to establish a programme of work to explore options for reform of a number of aspects of our research system. Collectively, these proposals could represent the most significant reform to our public research system since the creation of the CRIs in the early 1990s. However, I intend the process to be inclusive and deliberative, with

ongoing public consultation and engagement. We will have further opportunities to consider the level of change and the extent to which the costs of change will be commensurate with the expected benefits.

- 49 With Cabinet's agreement, I will seek approval for a 'green paper' consultation document by 31 July 2021, which will set out a range of options for possible reform. The main areas I propose to consult on are set out below. These are – developing a system to establish a clear set of national research priorities, reforming the funding system to give effect to those priorities, and ensuring our research institutions are equipped to deliver on them.

*The proposed programme of work will affect different entities in different ways*

- 50 The programme of reform I propose in this paper will focus on the entire RSI system, and will therefore have an impact on all the organisations which make up that system. However, the impacts will be different for different entities, and certain aspects of the programme will only extend to certain organisations.
- 51 The scope of the programme is set out in more detail below, but as a general rule, I propose changes to funding to extend only to funding administered as part of the RSI portfolio, and changes to institutions to extend only to the institutions within that portfolio, namely the CRIs and Callaghan Innovation. As the programme progresses, we may collectively conclude that changes to non-RSI funding and institutions are sensible and desirable. But I intend that such proposals, if any arise, will remain the responsibility of the relevant portfolio Minister, and will be discussed thoroughly and early with Ministers and agencies in any portfolios affected.
- 52 This work programme aligns with the outcomes sought by the Minister of Education in his upcoming Cabinet paper on proposed changes to PBRF funding to:
- 52.1 Support a holistic approach to recognising and rewarding research;
  - 52.2 better reflect and partnership between Māori and the Crown;
  - 52.3 Recognise and build on the growing diversity in New Zealand; and
  - 52.4 address existing inequities experienced in different aspects of tertiary research, research assessment and by researchers themselves.
- 53 Although research performed on behalf of businesses in public institutions will also be affected by this programme, I do not intend to reconsider R&D funding directly to businesses (such as the Tax Incentive) as part of this programme.

*We need to move towards articulating whole-of-system research priorities clearly and explicitly*

- 54 Our current system lacks clearly articulated priorities at a system level. It is characterised by a large number of different priorities. These are integral (e.g. as embodied in the National Science Challenges), implicit in budget decisions (e.g. new Strategic Science Investment Fund platforms) and originating from other Government departments in the form of various roadmaps, strategy documents and priority lists. In

addition, organisational strategies (and therefore priorities) are also set individually by Universities and CRIs, creating a further set of priorities. CRIs are also obliged in some measure to consider the priorities of their industry partners.

- 55 The overall picture is one of unnecessary fragmentation and priority clutter. While our research system struggles to direct resources clearly towards areas of the highest importance, Government, as funders and stewards of the research system, struggles to give effect to its priorities through the same system.
- 56 For example, we currently lack a locus of effort for climate change research. Officials consistently struggle to identify how much we actually invest, whether it is invested in the right way, and how our contribution might be most effectively improved.
- 57 We need a set of clearly expressed, whole of system research priorities. Ideally, priorities will act as focal points for investment mechanism and accountability, and provide transparency for Government's investment intentions. The system will be more effective if it concentrates resources meaningfully on a focussed set of activities.
- 58 I note that individual agencies and sectors currently have dozens of priorities and that this, cumulatively, adds up to a very long list to which it is difficult to give effect. We will need to sharpen our approach and also recognise that what is needed in the future will not necessarily be the same as what was needed in the past.
- 59 The work in this area will be in two stages. We will need to design a process, and appropriate governance structures, for determining our priorities. We will then need to run this process. For the initial consultation process I propose in this paper – the mid-year green paper – I propose to consult on the process for determining the priorities. The priorities themselves will be determined using the process we then design, at a later date. International literature, and feedback from our ongoing engagements on the RSI system, are clear that the priorities process will need to be highly robust and transparent, and for that reason, it will need to be designed extremely carefully.
- 60 The national priorities will need to apply across our system to public research institutes, universities, IROs and businesses where appropriate, and replace the existing broad range of sometimes conflicting research priorities in our system.
- 61 However, I do not intend that these priorities will apply to the entirety of our research efforts. Businesses will, in large part, continue to determine their own priorities; but I expect they will contribute in some measure to defining priorities, and will conduct research under the priorities where it is applicable. Universities will similarly contribute to priorities where appropriate, and where they are funded to do so, but these proposals are not intended to impinge on or compromise academic freedom.
- 62 It remains vitally important that parts of our research system remain outside the remit of a priority-driven strategy. Researchers also need to be able to investigate future opportunities for New Zealand without the constraint of existing conditions or priorities. I envisage a future system where parts are governed by a set of transparent national priorities, but a 'bottom-up' part remains where investigators are able to research and suggest new ideas, solutions, opportunities, and eventually new national priorities for us. This part of the system is vital, and must be preserved and grown.

*We need to explicitly fund the things we think are important*

- 63 Numerous successive reports on the research system, most recently Te Pae Kahurangi, have observed that dedicated funding should be provided for critical research functions, high priority services, emergency response and databases and collections.
- 64 In our current state, in the context of a variety of slightly different arms-length funding arrangements, specific funding decisions on these items are delegated to research organisations to manage and trade off against other priorities. This means our research organisations often face hard choices about balancing foundational research services against each other, or against other research functions, without priority guidance from Government or dedicated funding sufficient to maintain all aspects of their operation.
- 65 I propose to investigate funding options that mean our research organisations are not forced to trade off these important services against other research functions. One possible model is the way we currently fund the Measurement Standards Laboratory, with its own dedicated, ring fenced budget. I would like to explore this and other options.
- 66 Further work is needed to determine the exact scope of the services and functions which fall into this category. It is far from obvious where to draw the line on what constitutes a ‘critical’ research function, despite the overall concept being eminently sensible. I plan to draw on the results of consultation, and further investigation of international models, to inform what we should support in this way and how such functions should be governed.

*Our RSI system needs to make better, faster progress on supporting Māori and iwi aspirations*

- 67 We know that more work needs to be done to explore how the RSI system will seek to understand and respond to Te Tiriti obligations and opportunities. We must strengthen the role of Māori in the system and consider how we strengthen the system to achieve outcomes for Māori. We need to reimagine obligations and opportunities for Te Tiriti in our RSI system, better enabling Mātauranga Māori and the interface between mātauranga and other activities in our research system.
- 68 It is vitally important that any proposals in this area are developed alongside Māori, and it is for this reason that I do not note any more specific ideas for reform at this stage. Instead, I propose to engage with iwi and Māori throughout this programme of work to develop such ideas. I also propose to engage in confidence with Māori stakeholders during the development of the green paper, to ensure that when the green paper is released, it forms part of an appropriate and robust process to develop our thinking together. Similarly to the process as a whole, I do not expect the green paper to be our only avenue of engagement on this work programme, and I will seek to create ongoing and appropriate opportunities to engage with Māori throughout the process.

*We need our funding system to support the delivery of strategic research and whole-of-system priorities, and provide visibility and transparency to their delivery*

- 69 It is difficult to give effect to priorities through the current funding system. While we have access to a good instrument for purchasing strategic science that is of national significance, the Strategic Science Investment Fund (SSIF), it has proven difficult to implement it consistently in practice.
- 70 Many of the SSIF platforms that arose out of CRI core funding continue to be managed by single organisations as part of their overall organisational strategy. This is a legacy setting that serves to constrain collaborative effort and reinforces organisational siloes.
- 71 I propose to explore options to revise the policy around our SSIF platforms to provide greater coordination and insight over their activities. Key amongst the shifts I wish to explore are changes to allow Government departments and other key stakeholders governance roles in relevant platforms, so that, for example, officials and Ministers in the Primary Industries portfolio will have a greater say, and stake, in the Primary Industries research platform. This will also mean that priorities for research within individual areas will be set and governed by those stakeholders, according to plans or sub-strategies which are linked directly to the platform funding.
- 72 Implicit in this change will be a redesign of the subject areas of our existing SSIF platforms, and Callaghan Innovation's functions, to bring them into line with the national-level research priorities we determine through the process I mention above.

*We may also need to consider changing the way we fund research*

- 73 Some of our research organisations rely heavily on various streams of Government research funding for revenue stability. The mismatch between the function of these funds (supporting research determined as a priority through various processes), and their practical use (supporting some organisations to keep the lights on), means that changing priorities, or the results of funding competitions, can represent a significant disruption to our research organisations.
- 74 Unlike most other countries, New Zealand funds the 'full cost' of research via an overhead component calculated as part of project or programme specific research grants. We do not allocate grants to fund overhead costs for organisations, meaning research organisations are heavily exposed to the outcomes of funding competitions and national priorities. This in turn has the potential to distort the priority-setting process, and I believe it is, at least in part, leading to unproductive competition between research organisations as they compete for revenue.
- 75 The stability of an overhead cost grant could allow research organisations to be far more adaptable and resilient to future changes in priority than they are at present. It could also allow our funding competitions to fulfil their policy intent completely, and become forums for a competition for the best new ideas generated by the research community.

- 76 The idea of providing a grant to cover basic operating costs for research organisations separate to specific research funding is not new. It is the way most other countries' research systems have worked for a long time; indeed, it is hard for us to identify another country that funds research the way we do, with organisational costs funded only as a percentage of research funding. Harmonisation with international systems is another key argument for changing the way we fund research, as it will reduce barriers to our research organisations participating in international research programmes.
- 77 Such a move will be a major change for our entire research system (including CRIs, universities and private sector research providers who receive public funding), and involve a large amount of complex policy and operational work. The way the RSI funding system operates alongside the tertiary education funding system will be a particularly important node of investigation.
- 78 Despite the complexity of the work involved, I consider this idea has enough potential advantages to investigate further. I propose to explore this idea in consultation with the research sector.

*Our research institutions need to be enabled to respond to priorities*

- 79 Our institutions are not organised or governed in a way that enables resources or cross-system leadership to effectively push towards outcomes we are seeking. New Zealand's future needs present increasingly more complex and inter-dependent challenges for research institutes and the RSI system.
- 80 We are not alone in considering how our public research organisations can be best positioned for the future. Internationally, a number of countries have undertaken reforms to their systems with similar goals and challenges in mind.
- 81 International models suggest global trends towards:
- 81.1 fewer, larger organisations
  - 81.2 structural reforms that enhance connectivity with universities, and focus industry-targeted research
  - 81.3 reforms that position Public Research Institutes as part of a national research system, rather than inputs into a specific Government department or economic sector
  - 81.4 use of funding, rather than institutional design, as the main strategy implementation lever.
- 82 I would like to open a conversation with stakeholders about the potential costs and benefits of reforms along these lines, and their applicability to New Zealand. I propose to explore the following topics in more depth.

*I propose to re-look at the appropriate organisational format for our CRIs*

83 Since the early 1990s, our CRIs have been configured as a specific form of Crown Company. Following the findings of the 2010 review and Te Pae Kahurangi, I am persuaded that this is no longer an appropriate organisational form for them. I propose to explore alternative models, which may include various forms of Crown Agent or Crown Entity. I propose to consider the Callaghan Innovation's role within the RSI system as part of this process.

*Our CRIs may benefit from broader remits*

84 Our CRIs are constrained in their ability to respond to strategic priorities and complex interdependent research due in part to their narrow institutional design. The fixed core purposes of CRIs gives them limited ability to flex and change direction in response to the changing world. This limits the ability of the institutions to be future focused and hinders the system's ability to respond to broad challenges (e.g. climate change) that require a connected approach, drawing from multiple disciplines and sectors. To enable the kind of adaptable, dynamic research institutions that are capable of responding to emerging priorities, they need to be given greater flexibility of scope of operation.

*Institutional reform of CRIs may be needed to ensure adaptability and connectivity across the system*

85 A number of commentaries and reports have suggested ways in which research organisations could move over time to becoming more connected and resilient. These include –

- 85.1 the development of a customer-facing 'single front door'
- 85.2 collective workforce initiatives, including skills planning and reducing barriers to researchers moving around the system, to enable more diverse and attractive career paths and workforce development opportunities
- 85.3 standardisation of common functions, such as IT and HR systems
- 85.4 proactive identification and resolution of areas of overlap and duplication between research organisations
- 85.5 Stronger coordination and optimisation around property and infrastructure investments. Integrated investment planning would enable system-level allocation of capital for both property and research equipment and infrastructure, co-location of public research functions, Universities and innovation infrastructure, and physical hubs or clusters which allow the broad sharing of resources and people.
- 85.6 The development of innovation infrastructure that can support the translation and commercialisation of research.
- 85.7 Enabling the incorporation of Te Tiriti obligations and opportunities and strengthening the interface between Mātauranga Māori and science



- 86 If we decide to pursue these ideas, taken in combination with the idea of a more flexible research focus for our CRIs, the cumulative effect of these changes will be to create a system where there may be little benefit in retaining eight separate organisations (seven CRIs plus Callaghan Innovation). Consolidation is not a necessary aspect of this future state, but it may be a critical element in achieving it. The benefits of such a move will need to be weighed carefully against potential costs, and we will need to give careful consideration to the form into which our research institutions may transition.

*There is a range of options for the form of future research institutions*

- 87 The options for the form of future research institutions include retaining the current eight (but potentially with more consolidated governance and organisational functions), or moving to fewer, larger organisations. At the opposite extreme, a single organisation is an option, but not one I consider desirable.
- 88 The policy choices around fewer, larger organisations focus on the basis on which they would be constituted. This could be some mixture of sector focus broader than the current state (e.g. natural resources), and discipline or research focus (e.g. life sciences). If we decide on more fundamental institutional reform, we will need to consider these choices carefully in consultation with participants in the research system.
- 89 We will also need to consider that, while Callaghan Innovation houses a substantial public research function, it has other non-research roles and functions that CRIs do not. An appropriate solution for all of those functions will need to be arrived at.

*Universities are out of scope for direct institutional reforms, but I would like to consider options which encourage and enable them to connect more fully with CRIs*

- 90 Universities are not in the scope of any direct institutional reforms for this programme of work. However, one of my core objectives is to encourage much stronger connections between universities and other parts of the research system, and it is my intention that universities will be engaged with as part of the consultation phase later this year.
- 91 Many of the proposals above are focussed on closer connections between universities and CRIs, including those around property, infrastructure, and workforce. I consider that these are areas in which universities are currently enabled to work in a connected, future focussed way, and I propose that this work programme explores ways in which the levers within the RSI system can encourage and enable them to do so more fully.
- 92 I propose to include a range of options for future institutions, as potential models for discussion, in the green paper.

### **Next steps**

- 93 With Cabinet's agreement, I will seek approval for a green paper consultation document by 31 July 2021, which will set out a range of options for possible reform.

94 I intend the process to be inclusive and deliberative, and we will have further opportunities to consider the level of change and the extent to which the costs of change will be commensurate with the expected benefits.

95 We also need to incorporate a Te Āo Māori view into the development of the green paper. There are a diverse range of Māori stakeholders in the RSI system including Māori researchers, Māori businesses, iwi, hapū, and other Māori users of research. We will seek to engage comprehensively and also seek advice from external expert groups.

### **Financial Implications**

96 There are no financial implications.

### **Legislative Implications**

97 There are no legislative implications.

### **Impact Analysis**

#### **Regulatory Impact Statement**

98 A Regulatory Impact Analysis is not required

#### **Climate Implications of Policy Assessment**

99 This proposal will likely contribute indirectly to emissions reductions through supporting New Zealand's transition to a low carbon, productive and inclusive economy.

### **Population Implications**

100 There are no impacts on specific population groups from this proposal.

### **Human Rights**

101 There are no implications under the New Zealand Bill of Rights Act 1990 or the Human Rights Act 1993.

### **Consultation**

102 The Ministry of Business, Innovation and Employment prepared this Cabinet paper.

103 The following government departments were consulted in the development of this paper the Ministry of Health, the Ministry for the Environment, the Ministry for Primary Industries, the Ministry of Education, the Ministry of Foreign Affairs and Trade, the Ministry for Social Development, the Department of Prime Minister and Cabinet, the Treasury, Land Information New Zealand, the Ministry of Defence, the Department of Conservation, Tertiary Education Commission, the National Emergency Management Agency, and the Prime Minister's Chief Science Advisor.

104 My informal conversations with the sector indicate that many are supportive of the direction of change signalled in this paper. However, as with all programmes of transformation, there will be a minority who do not. We will manage this risk through an inclusive and deliberative approach during the consultation and engagement on the green paper

### **Communications**

- 105 There are no announcements related to this Cabinet paper. I intend to make an announcement on the Future Pathways work programme, which will coincide with the release of a green paper for consultation following Cabinet consideration in July 2021.

### **Proactive Release**

- 106 I intend to proactively release this Cabinet when the green paper consultation document is released following Cabinet consideration in July 2021.

### **Recommendations**

The Minister of Research, Science and Innovation recommends that the Committee:

- 1 **Note** that meeting the challenges and opportunities of the future will require harnessing the collective capability of our RSI system, to tackle the complex and interdependent challenges that are central to New Zealand's future.
- 2 **Note** that while our researchers and research organisations continue to produce excellent research, our current RSI system is fragmented and is not well configured to meet these challenges and opportunities.
- 3 **Note** that while a number of reforms have been made to the RSI system over the past ten years to sharpen the system's focus on excellence and impact, the system still lacks connectivity and is not responsive to priorities.
- 4 **Note** that more work needs to be done to explore how the RSI system will seek to understand and respond to Te Tiriti o Waitangi/Treaty of Waitangi (Te Tiriti) obligations and opportunities and the interface between Mātauranga Māori and science. We will consult extensively and meaningfully with Māori as we develop this work.
- 5 **Note** that I intend to develop a work programme to reform the RSI system so that it is adaptable for the future, resilient to changes and well connected.
- 6 **Note** that key areas the work programme will focus on are:
  - 6.1 Giving the system priorities that focus what we do and ensures complex challenges (eg. climate change) have a clear locus of activity and dedicated resourcing.
  - 6.2 Reshaping the funding system to be able to give effect to those priorities, as well as build our capability needs now and into the future.
  - 6.3 Shaping our institutions in a way that they are able to give effect to those priorities and be adaptable in a fast changing world.
- 7 **Agree** to the development of a green paper consultation document which will set out a range of options for possible reform, with the main areas being:
  - 7.1 developing a system to establish a clear set of national research priorities,
  - 7.2 reforming the funding system to give effect to those priorities, and

7.3 ensuring our research institutions are equipped to deliver on them.

8 **Note** that I have instructed my officials to work across Government agencies to develop the green paper to ensure that the reconfigured RSI system better delivers to Government priorities

9 **Agree** that I will report back to Cabinet on the progress of the green paper by 31 July 2021

10

**Note** that while these proposals could represent the most significant reform for our public research system since the early 1990s, I intend for the process to be inclusive and deliberative.

Authorised for lodgement

Hon Dr Megan Woods

Minister of Research, Science and Innovation

