

15 March 2022

SUBMISSION:

TE ARAPAE RANGI: FUTURE PATHWAYS GREEN PAPER

Key Recommendation

NERI supports the use of *Research Strategies* to better address NZ's difficult medium-term challenges but considers these *Research Strategies* must be integrated into wider *Sector Strategies* designed to address these issues.

From our experience in the Energy Sector, we consider this is generally lacking in our current research investment processes, and the need to formalise this interdependency goes beyond that foreshadowed in the Green Paper.

Background

The National Energy Research Institute (NERI) is a Charitable Trust incorporated in New Zealand. Its primary purpose is to enhance New Zealand's sustainability and to benefit the New Zealand community by stimulating, promoting, co-ordinating and supporting high-quality energy research and education within New Zealand.

Its research members are Auckland University of Technology, GNS Science, Scion, University of Canterbury and the University of Otago, and its industry association members are the Bioenergy Association, BusinessNZ Energy Council, the Carbon and Energy Professionals New Zealand, the New Zealand Wind Energy Association, la Ara Aotearoa: Transporting New Zealand, and Tourism Industry Aotearoa.

Response To Green Paper

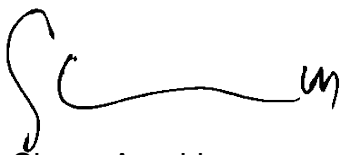
This mix of researchers and industry organisations helps address one of the core themes in the Green Paper, improving the co-ordination and increasing the relevance of New Zealand's research¹ effort. We are doing this in a significant sector of our

¹ Used throughout as defined in the Green Paper.

economy that has widespread economic, social, cultural, and environmental impacts on New Zealand.

This experience has particularly focussed on taking a strategic approach to the role of research in New Zealand, and priority setting. Consequently, our responses to the questions raised in the Green Paper focus on *1 Research Priorities*. This also raises some issues about *3 Funding* and *4 Institutions* that we also briefly touch on.

Our specific answers to the Question for Consultation are attached.

A handwritten signature in black ink, appearing to read 'Simon Arnold', with a stylized flourish at the end.

Simon Arnold
Chief Executive

Questions for Consultation

1 Research Priorities

Introduction

We will address the questions in this section by giving some background on NERI's experience in developing Research Strategies for the energy sector. But first we will make some comments on the current MBIE RSI focus on increasing NZ's Research Excellence as an end in itself.

Research Excellence as a focus in itself

Putting aside shorter-term business and policy research (driven by business and government's immediate priorities respectively) and the PBRF (out of scope), Government research funding addresses medium-term needs with a significant public good element.

Within that there are a significant number of existing funds whose overarching Priority is to develop world-class research in NZ. These invest in relatively broad impact areas (e.g., economic, environmental, cultural, social) but the ultimate focus of the individual programmes is researcher-led. Competition between providers determines where investments occur within a broad portfolio framework, and from that, the specific areas that get addressed.

By way of example the recent SSIF Advanced Energy Technology Platform (AETP) was established to encourage world leading energy technology science in NZ. While this general domain was set by the Government, in the end it was the successful proposals that determined the specific focus areas².

So, first and foremost, these kinds of investment are about research excellence. The process suits situations where the mission is to develop research capability in a sector or field but the specific outcomes from the research are deemed less important.

In what follows we assume that the current processes used to develop priorities for NZ's research excellence funding are adequate (although the balance across economic, environmental, cultural, and social capabilities may need to be addressed, and made more sensitive to NZ's wider needs).

The issue is how to establish priorities for research investments where outcomes for NZ beyond the research sector are the primary priority.

We will use NERI's experience in the energy sector as an example.

² High powered electric motors for transport, process heat decarbonisation, future electric power system, green hydrogen technologies.

Meeting sector needs as a focus

In contrast to the AEPT, a first principles' assessment of NZ's energy sector's needs and the medium-term research required in support would have been led to a wider set of Priorities³.

In some sectors there are government research funds that do addresses quite specific medium-term, economic, social, cultural, and environmental strategic issues. National Science Challenges (NSC) go some way, but as the Green Paper notes there are limitations created by the institutional framework, coverage is incomplete⁴, and in practice the Challenges have been set at a higher level than the goals and missions implicit in the Green Paper.

Outside the NSCs, this area of public research investment is recognised as being weak in New Zealand⁵, and in the case of energy virtually non-existent⁶.

We support a move to increase this type of research and turn to the means to best establish the focus of the research.

Central role of wider *Sector Strategies to Research Strategies*

Our energy sector experience suggests two conditions are required when selecting issues/challenges as a focus for NZ's research effort:

1. NZ has deemed it sufficiently important to have developed a medium-term wider *Sector*⁷ *Strategy* to address the issue/challenge, and
2. That *Sector Strategy* requires significant NZ based medium-term public good research investment, justifying developing a *Sector Research Strategy* in support.

The *Sector Strategy* then provides the basis for addressing the questions raised in the Green Paper in *1 Research Priorities*. Research investments will be able to be assessed on their contribution to achieving the *Sector Strategy's* goals and missions. The relative weight put on each area of research comes from its materiality in addressing the overall needs of the sector⁸.

Recognition of the central role of Sector Strategies is weak in the Green Paper.

³ NERI (2017), "Energy Research Strategy for NZ: The Key Issues" p. 22 outlines the main priority issues.

⁴ Energy is not directly covered by a NSC.

⁵ E.g., MBIE (2019), "New Zealand's Research, Science & Innovation Strategy - Draft for Consultation" identifies mission-led public applied research as a gap in the RS&I investment portfolio.

⁶ There is very limited funding for research in Vote: Energy Resources.

⁷ The term "Sector" is used for convenience but should be read to also encompass key areas of public interest e.g., responding to climate change.

⁸ As well as a range of other factors like the ability of medium-term research to address the issue.

Sector Strategies

The core issue becomes identifying where NZ needs medium-term *Sector Strategies* and developing these. They will come from a variety of processes involving relevant sector stakeholders including research interests.

Some issues that arise include:

- Finding a suitable sponsor to manage this process is made more difficult because the issues are medium-term, beyond business-as-usual, and have a significant public interest component.
- Achieving medium-term goals benefits from stability. Bipartisan support for multi-year Strategies and research investments is desirable.
- “Sectors” can be defined in multiple ways, and this can potentially lead to overlapping and conflicting research Priorities. This needs to be managed.

We will illustrate some of these issues using NERI’s work on the energy sector.

Developing Sector Strategies

The energy sector faces challenges/risks and opportunities that go beyond business-as-usual and will require uniquely NZ research to address these. These include growing concerns about the impacts of energy-related emissions on the climate; new technologies bringing the potential to radically change the capture, conversion, and use of energy; and changes in consumer expectations and behaviours.

In the case of *Energy Research Strategy for NZ* NERI undertook a sector wide strategic review working in conjunction with the research community, the relevant business organisations, other interest groups in the energy sector including users, and government agencies⁹.

In the interests of achieving a degree of multi-Party support the then energy spokespersons for the Parties represented in Parliament were included¹⁰. This is the strength of using a body relatively independent from the Government of the day to manage the process.

In considering the scope of this work three particular issues were identified as important:

1. Energy has many applications and therefore potentially feeds into multiple sectors. For this reason, an energy sector strategy needs to address the complete value chains within it, through to end-use. Among other things this allows linkages to other sectors to be made explicit and ensures demand-side issues (often economic, cultural, and social) are within scope.
2. Energy comes in various forms and with appropriate conversions can meet the same need. This opens up important medium-term options that are an essential

⁹ MBIE Energy Policy provided some funding.

¹⁰ The then just appointed Minister of Energy and Resources, Megan Woods, launched the publication.

- part any energy strategy. Subsector strategies that only consider particular fuels (e.g., electricity) will be incomplete unless these options have been considered¹¹.
3. From a research perspective addressing complete value chains and alternative fuels requires a multi-disciplinary approach, with social, economic, cultural, and environmental research required across the board. This contrasts with a focus on research excellence that tends to address specific disciplines.

Research that contributes to multiple priority sectors

The energy sector gives a useful example of this issue. Energy is critical to NZ and warrants research Priorities in its own right. But fossil fuel use also creates ~40% of NZ's GHG emissions, and supplies ~70% of our energy. Any research strategy designed to help NZ address climate change will have mitigation of the impacts of fossil fuel use as a Priority.

NERI has a draft document in preparation *Energy Research Strategy for New Zealand: Reducing GHGs: Our Unique Challenges & Opportunities*¹². It has four high level strategic research themes¹³ that will likely lead to more expensive energy. But this is in potential conflict with NERI's wider *Energy Research Strategy for New Zealand* that has a theme to develop low-cost ways to keep the less well-off warm and dry.

These conflicts need to be managed as part of any Research Strategy development processes and may also drive priorities for research, e.g., in this case a programme addressing energy affordability.

But the process of being explicit about the wider Sector goals gives a framework to address the conflict. For example, the issue of affordability may well be directly addressed without medium-term research being required.

Te Tiriti

The starting point for giving effect to Te Tiriti is to ensure key Iwi interests are part of any processes designed to develop *Sector Strategies*. In some cases, the Sector challenges may be specifically Māori issues and managed accordingly.

Translating *Sector Strategies* to the supporting *Research Strategies* provides a process to ensure Iwi and wider Māori goals are included in the Research and Mātauranga Māori is explicitly included.

¹¹ Many of the administrative arrangements (e.g., regulatory) reinforce the narrow sub-sector viewpoint.

¹² Draft available on request.

¹³ These are useful for indicating the kind of level that research strategies should operate at: Reduce demand for long-haul transport; Develop clean/low energy industries; Clarify fuel options and implementation pathways for long-haul land transport; and De-risk the supply of clean fuels where significant demand is anticipated.

Summary on priorities

To summarise, the starting point for *needs-based* research Priorities is to identify NZ's strategic priority sectors/areas of public interest, to then develop *Sector Strategies* to address these, and only then from that the *Sector Research Strategies* in support.

This then gives a process for directly addressing the issues raised in *Section 1 Research Priorities* of the discussion document.

2 Te Tiriti, mātauranga Māori and Māori aspirations

No further comment

3 Funding

No comment on the specific questions, beyond noting that the critical core function would lie in participating in *Sector Strategy* development and having responsibility for developing the supporting *Sector Research Strategies*.

Given the need for *Research Strategies* to be closely linked into the Government's various sector priorities the issue arises whether they should be funded at least in part through the relevant Votes (as already occurs in some case). This would have the advantage of encouraging the link to medium-term *Sector Strategies* and aligning research priorities with other medium-term investment expenditures in the Vote.

If this was done funding the core functions and base grants could remain with RS&I in Vote: Business, Science and Innovation.

4 Institutions

No comment on the specific questions, apart from:

- Reiterating the need for the institutional arrangements to provide for participation in *Sector Strategy* development and in developing the supporting *Sector Research Strategies*. This is the role NERI has been playing in the energy sector.
- Noting the critical role of the institutions in being able to deliver on complex multi-disciplinary Challenges with diverse stakeholders and using research capability spread across NZ and internationally. A primary imperative, not mentioned, will be to develop institutions that are able to manage these kinds of programmes and ensure impacts are achieved.

5 Research workforce

No comment on the specific questions, apart from noting workforce Priorities should arise as part of any *Sector Strategy* and funding should flow through the same mechanism as research funding.

6 Research infrastructure

No comment on the specific question.