

23 November 2021

Ministry for the Environment

Submission on:

Draft Emissions Reduction Plan

Summary

- The general approach to the need for RS&I to manage the medium-term risks and uncertainties in achieving clean energy is supported.
- Specifically, a significant appropriation to help address the gap in medium-term applied directed NZ-centric energy RS&I focussing on this issue is a priority.
 - The gap in funding sits between Endeavour and close-to-implementation business and policy RS&I.
- NERI¹ is in the process of identifying the high-level research themes to address the currently understood risks and uncertainties in eliminating the GHG impacts of fossil fuels. It is planning to publish early next year.
 - The current consultative draft is enclosed with this submission.
 - Its strength is in being focussed on the material, and inclusion of the whole sector including energy demand and all potential impacts.

Need for this RS&I and applied directed funding

Over the last 4-5 years NERI has been concerned about the need for specific RS&I funding to assist NZ manage its medium-term risks and uncertainties in achieving clean energy. It was an underlying theme in our 2017 “Energy research Strategy for

¹ 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, the Road Transport Forum and Tourism Industry Aotearoa.

NZ: The Issues”² and based on that we had included it as a theme for funding in our 2017 “Brief to incoming Ministers”.

In the end there was new money, the Advanced Energy Technology Programme (AETP), focused on technologies and investigator-led rather than applied directed.

The need for mission-oriented applied directed research into energy emissions reductions has been an increasing theme in our Submissions since, e.g., the Productivity Commission’s consultative processes on emissions reductions.

In 2019 we explicitly discussed this in our comments on the “Draft Research Science and Innovation Strategy” and recommended:

... the Energy Research Strategy and subsequent work as providing the framework for where and how the RSI system can make the greatest contribution towards the transition to a clean, green, carbon-neutral energy sector in New Zealand.

Overall, we bought these themes together in our “Post Election Briefing 2020” that discusses both the need and the funding gap. We recommended Ministers:

Make a significant appropriation to Vote: Energy and Resources to help address the gap in medium-term applied directed New Zealand-centric energy research.

This came with a number of additional points we would want to repeat in this context and have therefore included the relevant extract from that Briefing as Appendix 1.

You will note that this recommendation targets the use of *Vote: Energy and Resources*. The reason for this is discussed briefly in the extract, but further note the Draft Emissions Reduction Plan has much less on Agriculture because it has been able to work off the base created by the applied directed research that has been funded historically through *Vote: Primary Industries and Food Safety*.

Eliminating GHG impacts of fossil fuels: high-level research themes

Based on its work so far on this issue NERI has started the process of developing a framework for addressing the medium-term uncertainties and risks in eliminating the GHG impacts of fossil fuel use in NZ. Accompanying this submission, we have attached the discussion draft we are using in our current consultations on this. This has no formal status beyond that.

A particular contribution is that it is tightly targeted on mitigating the effects of fossil fuel use, and does this by considering the prospective value chain (Slide 4) to identify the material areas of uncertainty and risk (i.e. targets for RS&I). By only addressing fossil fuel emissions, and only the material areas, priority areas are able to be lifted out of the noise.

² <https://www.neri.org.nz/strategy>

There is still much to develop. The prospective value chain in the Draft is weak in its treatment of the relationships to demand, and to impacts. Other significant themes are being suggested. These will be addressed as the work progresses.

We see this developing body of work specifically informing the Ministry of Business, Innovation and Employment's (MBIE) Future Pathways Programme, and contributing to increasing medium-term applied directed mission-oriented NZ-centric energy RS&I.

We are currently on a timescale of early next year for publication.

We have not specifically addressed the Question raised in the consultative document but would note most of the initiatives sit in the domain of current policy or private responses. We here are addressing the issues that lie beyond that, into the realm of the predominately publicly funded RS&I system.

In terms of Questions 36 – 41 that directly address RS&I issues, we would note that this submission does provide a framework for considering Q. 36, 37, and 40 and initial views on the answers.

Q. 38 has not been discussed because the existing funding mechanisms are addressing this, and a stocktake could be undertaken from that³.

Recommendations

That the Government:

1. Make a significant appropriation to help address the gap in medium-term applied directed New Zealand-centric energy GHG-reduction research.
2. Note the work that NERI is undertaking identifying the high-level research themes to address the currently understood risks and uncertainties in eliminating the GHG impacts of fossil fuels, and work with it in developing this as part of the MBIE Future Pathways Programme.



Simon Arnold
Chief Executive

³ Such a Stocktake was undertaken by NERI in 2017 and was included in the Appendix to "Energy research Strategy for NZ: The Issues". NERI could update this if required.

Appendix 1

Extract from NERI “Post Election Briefing 2020”

1. Our energy sector faces major changes over the next 20 years

- The shift away from fossil fuels to low emissions alternatives. The latter tend to be much more dispersed, less energy dense and, currently, higher cost. This will mean major shifts in how New Zealand will source, store, transport, and consume energy.
- Consumer preferences are also shifting toward clean energy and sustainable products. When they reach a tipping point these changes can be rapid, significant, and felt throughout the complete energy supply chain.
- Development of new Energy Technologies continues to accelerate. New energy technologies are reducing costs, increasing efficiency, and increasing our options to manage impacts, including demand reductions. They often enable decentralised, flexible, and more consumer-centric solutions, and with that can drive significant changes in the sector.
- COVID has had some dramatic immediate impacts on the sector, some positive and others negative. These are influencing our ability to achieve an equitable transition to a sustainable, low emissions society. For example, the uptake of remote working and greater support for local produce are likely to be positive, but reductions in international research collaborations and education will reduce our capacity to adapt to changes.
- The changes are global with local impact. New Zealand depends upon the global energy sector. The only energy we trade in is fossil fuels, with imports supplying more than half the energy New Zealand uses; innovation typically comes from abroad notwithstanding us having our share of cutting-edge energy innovations; and we compete for skills internationally.

2. New Zealand faces significant and difficult issues, many of which are unique.

- New Zealand’s isolated geography, current and potential energy supply and demand, and sector and social and environmental “pinch-points” are relatively unique. Uncritically following international responses will be a mistake.

Some examples of the issues for New Zealand are:

- How best to protect those that are most vulnerable and exposed to the changes? Improving access to energy, reducing energy poverty, achieving warm dry homes, ensuring the availability of mobility, all at a time of change.
- Managing dislocation in employment. Assisting communities through the changes.
- Managing major growth in a relatively unique renewable electricity system while responding to new disruptive technologies (e.g. dry year cover, increased distributed generation).
- Uncertainty in the supply and demand for EVs; fuel supplies for our strategic long-haul air and marine transport; the best fuels for higher duty cycle land transport: better batteries and charging, other electricity carriers (e.g. electrolytic hydrogen); or biofuels.

- The future use of energy in our energy-intensive industries, including the best uses of what will become internationally scarce clean energy.

Successfully addressing these issues ahead of the rest of the world could provide the basis for export opportunities in energy technologies and services.

3. The gap in our current response is in considering the longer-term

- Shorter-term policy issues that touch on the above issues are being addressed. But more difficult energy-related issues lie in the 2030s+.
- When it comes to climate change impacts the Productivity Commission and the Interim Climate Change Commission have both provided some context, and the Climate Change Commission will no doubt provide an overarching assessment and on longer-time scales. However, detailed consideration of specific opportunities and risks in the medium-term and the impacts of technologies is still lacking.
- It is here where the energy research and education community can contribute.
 - Well directed medium-term applied research will reduce the uncertainty and risks in our energy plans, and develop options, opening opportunities, where uncertainty remains.
 - Having skilled people available to address the issues that arise and provide the skills needed in the new environment will smooth the changes.
- Both require informed investment with a view to medium-term outcomes.
- Together they are essential components of a more resilient New Zealand, better able to manage significant change and achieve Just Transitions.

Recommendation 1:

Make a significant appropriation to Vote: Energy and Resources to help address the gap in medium-term applied directed New Zealand-centric energy research

- Internationally, future energy technologies are regularly scoped, road-mapped in a national context, and then funded⁴. Unfortunately, as noted above, the assessments and roadmaps often do not transfer to the New Zealand context or reflect our priorities.
- NERI has provided a high-level context in its *Energy Research Strategy for New Zealand: The Key Issues*⁵. The RS&I sector has recently invested in an Advanced Energy Technology Platform, this was focused on internationally competitive technologies on an investigator-led basis, and only generally on New Zealand's specific needs.
- The energy issues we now face are very much New Zealand-centric and the demand side and social impacts are both central. They will not be solved by a single technology or policy response. They are complex, will take time and will require a multidisciplinary approach. Addressing them systematically will be a central to the Just Transitions work programme.

⁴ Notably the US Department of Energy.

⁵ www.neri.org.nz/strategy

- New Zealand currently lacks dedicated and coordinated funding to address this need⁶, or an overarching research roadmap(s) to inform these kinds of research investments.
- This is a significant weakness in our efforts to manage these changes. The Parliamentary Commissioner for the Environment has just proposed a similar approach in *Vote: Environment* to address an analogous problem in the environmental sector⁷.
- This type of funding already exists in the other major sector contributing to greenhouse gases, *Vote: Primary Industries and Food Safety* where it has been used, for example, to address methane emissions from ruminants.
- A similar appropriation is recommended for *Vote: Energy and Resources* along with a process to roadmap New Zealand's requirements to inform its investments.

⁶ The *Draft Research, Science and Innovation Strategy* <https://www.mbie.govt.nz/have-your-say/draft-research-science-and-innovation-strategy/> identified this lack as a general issue in the Government's RS&I investments.

⁷ *A review of the funding and prioritisation of environmental research in New Zealand* <https://www.pce.parliament.nz/publications/environmental-research-funding-review>. While addressing a different sector the report gives more background to the general problem and explores options for implementation.