National Energy Research Institute

26 July 2021

Ministry of Business Innovation and Employment
Wellington

Attention: Energy Markets Policy group
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Sustainable Biofuels Mandate Submission

This brief submission from NERI[1] draws attention to a particular issue in the implementation of any Sustainable Biofuels Mandate that is not explicitly addressed in the discussion document or the submission form.

The cost and speed with which the mandate meets its objectives depends heavily on the rate of innovation in the transport biofuels sector. While imported biofuels will largely be used to meet initial commitments, domestic supplies will be needed in the medium-term. This will require New Zealand specific R&D covering the supply of biomass, and biofuels production and demand. There will be components of this that goes beyond the capability of the industry to fund, i.e., that requires longer-term, applied, directed, public good research.

The current capacity to address within the RS&I, Energy or Transport research funding mechanisms is limited. This has been recognised by a number of recent reports (e.g., Climate Change Commission on emissions reduction 2022-25; MoT *Transport Emissions: Pathways to Net Zero by 2050* e.g., Chapter 4), and NERI has addressed

[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.

the lack of directed applied research funding in energy and transport on a more general front in our *Post-Election Briefing Dec 2020*[2] (extract attached).

Because of the timescales required for this type of R&D to reach fruition (i.e., late this decade) there is a need to start addressing these issues now.

Accordingly, we recommend that any policy package to introduce any mandate should provide for explicit research funding to address this need, and a joint industry, researcher, and government process to develop the key research priorities for funding, oversee progress, and keep the priorities current.

NERI is happy for this brief submission to be made public and published by MBIE or MoT as they see fit. It contains no confidential information.

Finally, several NERI members have made individual submissions and NERI has had input into some of these on the detail.

Withheld under section 9(2)(a)

Simon Arnold
Chief Executive

[2] Available at https://www.neri.org.nz/resource/Files/Submissions/Post%20Election%20Briefing%202020.pdf

Attachment: Extract from NERI *Post-Election Briefing Dec 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 funded[3]. 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*[4]. 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.

[3] Notably the US Department of Energy.

[4] www.neri.org.nz/strategy

- New Zealand currently lacks dedicated and coordinated funding to address this need[5], 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 sector[6].
- 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.

[5] 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.

[6] *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.