

4 February 2019

## **SUBMISSION ON: PROCESS HEAT IN NZ**

### **Introduction**

In November 2017 the National Energy Research Institute<sup>1</sup> published the *Energy Research Strategy for New Zealand: The Key Issues (the Strategy)*<sup>2</sup>. This identifies major beyond business-as-usual risks and opportunities anticipated in the energy sector arising from social, technical and environmental changes with a view to developing a research programme to help manage these.

NERI and its members, in conjunction with relevant industry groups, are beginning the process of developing more detailed programmes to address these priority issues.

Many of the questions in the Technical Paper are seeking direct experience from respondents. We are not in this situation, and while there are reports and analysis of these we could reference, we assume MBIE and EECA are privy to this.

Instead, in the course of our wider work we have identified some issues relevant to the Paper. We have used this as the basis for this submission. Therefore it may not necessarily represent members' individual views. If the Review would like more detail we would be happy to discuss.

As a general introductory comment we would reinforce the point that the use of fossil fuels in this sector is dominated about equally by the Chemicals and Food Industries.

The former is by and large a small number of large producers. Change will require significant adjustments to processes (and possibly products) and is likely to occur incrementally. Lowering emissions is therefore primarily a matter for the companies working where necessary with the Government.

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<sup>1</sup> 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, coordinating and supporting high-quality energy research and education within New Zealand. Its research members are Victoria University of Wellington, Auckland University of Technology, Scion, GNS Science, University of Canterbury and the University of Otago, and its industry association members are the Bioenergy Association, BusinessNZ Energy Council, the Energy Management Association of New Zealand and Tourism Industry Aotearoa.

<sup>2</sup> National Energy Research Institute, "Energy Research Strategy for New Zealand: The Key Issues," National Energy Research Institute, 2017.

In the Food Industry energy is integral to the process of preservation (e.g. drying<sup>3</sup>, cooking, refrigeration). While there is considerable research into future foods in NZ, by-and-large this has not targeted new more intrinsically low energy food value chains. We are therefore proposing to scope this, and this may have implications for the Government's work in this area.

## Barriers A to H

### Q1-Q14

We would make four general comments on the questions:

- If the pricing doesn't reflect the agreed externalities then there will be under/over investment and this should be fixed. Helping companies to assess the inevitable uncertainties in future prices for investment decisions would be a useful intervention, but this doesn't argue for the need to produce certain price paths<sup>4</sup>. Rather it argues for better understanding on the part of industry of how to incorporate that uncertainty into investment decisions.
- There are obvious cases where there is a conflict between good pricing and other goals, and this needs to be managed. The one mentioned in the Paper is the industrial allocation and emissions leakage. In this case the Crown could offer to buy-out the industry allocation by covering the incremental cost of new clean plant, and this could be a useful and efficient form of intervention.
- It would appear that a significant proportion of the fossil fuel use is by companies of substance who are much less likely to be concerned about Barriers F-H. This suggests different interventions by size, and this will no doubt be indicated in the response.
- Barrier H is widely recognised in the introduction of new technologies, particularly in process industries where it is often the scale up that represents the biggest risk. This becomes doubly so if the whole supply chain is new. Further it shouldn't be assumed that the local consultancies do have confidence here, and they will themselves be risk averse where professional liability and reputation are on the line. This does call for interventions to address this issue and help private firms to overcome "first mover disadvantage".

## Barriers I to K

### Q15-Q18

In discussing Barrier I it is important to recognise that electricity isn't a uniform commodity (as Footnote 14 reminds). Heat pumps for instance are likely to outperform other technologies because of their high CoPs in thermal energy transfer application. As the report notes high temperature heat pumps are becoming available, further widening this technology's application. This is an example of the need to have interventions to assist the uptake of new technologies.

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<sup>3</sup> The bulk of the demand is a relatively small number of dairy companies.

<sup>4</sup> At least to the extent that the uncertainty reflects the real world.

It is also important to take into account the generally favourable load profile of industrial demand. Electricity has a relatively high fixed cost and so it is more competitive in the high uniform load situations typical of industry.

This section therefore needs to break down the various applications. It will probably find that electricity makes good sense in many industrial process heat applications at surprisingly low CO<sub>2</sub>-e charges.

Equally it should recognise that other fuels might be more economic in other applications e.g. biofuels. So the issue for industry is finding the optimum mix and managing their integration.

Otherwise it will be interesting to see the responses from industry on the other barriers. As a general comment the availability of technologies to help manage backup supply is increasing, including decentralised CHP. This is likely to reduce Barrier J3.

As a final note, and this also applies to the rest of the report, the implementation of each of the alternative fuels is contrasted with the current ease of continued fossil fuel use. This may well not be so e.g. future CO<sub>2</sub>-e charges are uncertain, as is continuity of supply of natural gas.

## **Barriers L to N**

### **Q19-Q22**

Outside the Pulp and Paper Industry bioenergy (including wastes) has not had a great deal of attention from public policy or industry, although this is changing with some boiler conversions.

However based on our work, and the work of our members, it is becoming clear that bioenergy will be the lowest cost low emissions fuel for not just parts of the industrial process heat market, but also aspects of long-haul transport (aviation, marine and some surface) and winter/dry year building thermal loads.

However rather than treating these particular Barriers in isolation (and there are others not covered), they need to be considered in the context of bioenergy in NZ being a nascent industry, and given the more systematic and strategic attention by the Government that that implies.

### **Q23-24**

We would endorse the general observation that industry is likely to be grid connected, and this reduces the attractiveness of distributed generation from solar and wind. Highly correlated loads (e.g. refrigeration with PV) might be indicated particularly if it can reduce peak loads and hence address capacity constraints/reduce capacity charges.

Footnote 17 seems irrelevant to the NZ situation.

## Q25-27

We would draw attention to the use of low temperature ground source heat pumps mentioned in the Geothermal Strategy. These broaden the potential locations at which geothermal can be applied.

In passing on hydrogen as a fuel for high heat loads in industry, we would agree with your comments (para 121) based on the now published Concept analysis<sup>5</sup>. However the UK Climate Change Commission has just published a report on hydrogen<sup>6</sup> that does see hydrogen used in this application in preference to biomass when CCS is not possible. We have a note in preparation<sup>7</sup> that concludes this does not apply in the NZ context.

We would be happy to discuss any aspects of this Submission further.

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

Simon Arnold  
Chief Executive

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<sup>5</sup> Concept Consulting, "Hydrogen in NZ: Reports 1, 2 and 3," Concept Consulting, Wellington, 2019.

<sup>6</sup> UK Committee on Climate Change, "Hydrogen in a low-carbon economy," 2018.

<sup>7</sup> Available on request.