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Subject: Submission on consultation document:

“Process Heat in New Zealand: Opportunities and barriers to lowering emissions“

1. The Bioenergy Association welcomes the work being undertaken by MBIE and EECA with regard to process heat. The Association agrees that process heat is an area where transition from use of coal and natural gas can provide significant reduction in greenhouse gas emissions reduction by 2050.
2. The Bioenergy Association represents a significant portion of owners of heat plant, biomass fuel producers and suppliers, waste-to-energy consultants, researchers and equipment/appliance suppliers across New Zealand. It has members who have an interest in policies relating to the utilisation of biomass and waste for the production of energy; reduction of emissions to air in communities from both residential and commercial/industrial scale heating applications, and from decomposition of waste; and wise use of our renewable natural biomass resources for the betterment of communities. Residual organic waste is considered to be a renewable biomass resource.
3. The Association has Interest Groups whose members manage the Association’s specific technical matters relating to the wood energy via combustion, waste-to-energy via anaerobic digestion, and liquid biofuel sectors, specifically with regard to standards and best practice. The Interest Groups host workshops and dissemination of information to those interested in the respective sectors, or considering investment. This submission is provided on behalf of members and has been approved for sending by the Association Board.
4. The Association generally agrees that the issues identified in the consultation document need to be addressed but finds the report very limited in its scope, analysis and focuses on a very limited perspective of the process heat market. As a consequence the report reads as if it is all “too hard” when a different approach would identify that a lot of transition from use of coal and gas for process heat opens up opportunities, is economic and is relatively easy to achieve. This is disappointing considering the amount of work which has already been undertaken by industry to transition process heat to be built on renewable fuels.

5. The Bioenergy Association has identified that the wood energy sector could transition 20PJ of process heat from coal and gas by 2050, resulting in annual greenhouse gas emission reductions of 1800 kt CO₂-e pa¹. In addition 4.6PJ of energy could be obtained from organic waste and this would reduce greenhouse gas emissions by 1811 kt CO₂-e pa by 2050². These levels of greenhouse gas emission reduction are comparable to other initiatives being considered by Government.
6. Because the discussion document has a very narrow scope it fails to understand the characteristics of bioenergy which differentiate it from other fuels used for process heat. These are³:
- The use of biomass fuels for process heat are proven and widely used by those with immediate access to their own biomass which can be used as a fuel.
 - The market for buying and selling biomass fuel by those without immediate access to their own sources of biomass is in its infancy but now has strong foundations.
 - The biomass fuel supply chain has a number of players but like any evolving market the New Zealand biomass fuel supply market has cornerstone players who are expanding their supply capabilities at a fast but orderly rate so that boom/bust scenarios will be avoided.
 - There is potentially no reason why biomass fuel supply will be a future problem as there are many avenues for sourcing biomass such as using the 1 billion trees programme to produce a new carbon sink every 30 years by planting commercial forests. Managed shelter belts can provide additional revenue from sale of biomass fuel and improve farm business resilience. Wood processing could be intergrated at least cost with waste to energy bio-processing.
 - To achieve the Net Zero goal by 2050 will require incentives to reward early adopters and mitigate adoption risks until the ETS carbon price is over \$50/t_c by 2025 and \$100/t_c by 2035.
 - Biomass processing initiatives to achieve what are often public benefits are generally highly integrated with other sectors and other activities so cross sector and all-of-government approaches are necessary.
7. Unfortunately, and in contrast to all other renewable energy options, bioenergy or an emerging bioeconomy (circular economy) must consider the interactions between land use, land use change and energy production. The key to moving to a low emissions economy is all about moving from fossil fuel derived carbon to biogenic carbon and doing this in such a way to stop using fossil fuels and reduce the net concentration of CO₂ in the atmosphere. To have any meaningful contribution to the discussion about the role of bioenergy in the process heat market, the analysis must consider land use and biomass production and how by integrating these two aspects can contribute to the low emissions economy for sectors

¹ Bioenergy Association Information Sheet 48 – Reducing greenhouse gas emissions to achieve “Zero carbon by 2050” using biomass energy for industrial and commercial heat. <https://www.bioenergy.org.nz/documents/resource/Information-Sheets/IS48-GHG-reduction-using-wood-energy-190124.pdf>

² Bioenergy Association Information Sheet 47 The role of organic waste and biogas in the transition to low carbon economy in New Zealand <https://www.bioenergy.org.nz/documents/resource/Information-Sheets/IS47-Role-of-biogas-in-transition-to-low-carbon-economy.pdf>

³ <https://www.bioenergy.org.nz/resource/is49-bioenergy-the-renewable-fuel>

that have a demand for process heat. Largely, the barriers identified and discussed in the document are a feature of a constrained analysis and do not now reflect international developments and trends in the renewable energy sectors.

8. The process heat programme should be considered in the context of an all-of-government discussion on where New Zealand could be by 2050 with regard to energy, climate change, employment and export opportunities. A paradigm shift in thinking to ‘what are the opportunities’ and away from “what are the problems” will do more to transition New Zealand to a low carbon economy. The process heat programme is just part of that discussion.
9. The key issue to be addressed is that Government adopt an approach of working with industry on “how to make this work”. This will require a paradigm shift in thinking about the energy market. The Geothermal sector have proposed a similar shift in thinking in their Geoheat Strategy. The bioenergy and biofuels sector has a similar strategy for biomass energy. Energy Management Association has been developing similar for gaining improvements in the use of energy. Collectively industry is saying “yes we can!”. If Government established a Process Heat Advisory Group involving officials and sector organisations there would be less duplication of effort and faster progress. Government going alone will result in the issues still being discussed by 2050.

IN RESPONSE TO SPECIFIC QUESTIONS IN THE CONSULTATION DOCUMENT

Barrier A: The cost of emissions is not fully priced

10. The Association agrees that “it is likely that price signals from the NZ ETS alone will not, or are unlikely to, influence behaviour for many process heat users.”⁴ There are multiple market barriers and different sector characteristics which, along with the public good benefits of transitioning from use of fossil fuels for process heat, reinforce the need for Government to work with industry to achieve the opportunities from a low carbon economy.
11. **Q1-4** The Association agrees with the summary of information on why the NZ ETS is a weak influence on process heat investment decisions in most business.

Barrier B: Energy projects have to compete with other capital investment projects

12. The Association agrees that “Objectives such as environmental sustainability or social responsibility are usually only considered [by potential business investors] as secondary objectives once the risk and return criteria have been met.” This reinforces the proposition that climate change objectives are primarily a public good and that government on behalf of all communities needs to be involved in the transition to a low carbon economy.

⁴ P14

Barrier C: Access to capital

13. Access to capital is generally determined by perceptions of business risk around any investment. If the process heat programme puts 'tools for risk management' as a key objective then this may address some of the perceptions around the transition from fossil fuels to renewable energy fuels.
14. In the biomass energy sector the Association has had provision of information and experience that reduces perception of risk its number one objective for growing the sector. For example the perception around wood fuel supply risk is being addressed by the identification of long term biomass fuel availability and the accreditation of fuel suppliers.
15. Government leadership of the use of bioenergy in the areas where capital investment is required can provide the demonstration to the private sector that needs to occur. Government already has installed a lot of biomass fueled heat plant in facilities at Corrections, Education and health so the data and examples are already occurring. What is missing is the desire to present them as role models and demonstration projects.

Barrier D: Aversion to production disruption

16. While the potential for disruption during change of any technology upgrade is a real concern for all business it is a matter which can be easily managed. Transition from use of fossil fuels will require good expertise no different than any other production plant change.
17. Biomass fuel can be used in a cofiring mode which minimizes the risk of disruption that can occur on any of the fuels. Wood pellet fuel is ideal for cofiring as it is homogenous and readily available because of existing storage facilities etc.

Barrier E: Hidden costs and benefits of energy improvements

18. The risk and opportunity of hidden costs and benefits apply to all business decisions and are no different for process heat projects. The Bioenergy Association undertakes a number of information dissemination activities to ensure that potential investors and their advisers are well informed about best practice and provided professional development opportunities for advisers. These education requirements are normal in all industries and are no greater for the process heat sector.
19. There are also considerable often hidden benefits which transition from coal to biomass can provide such as the reduction in the number of required staff because of low ash removal requirements etc.
20. **Q5-10** The matters noted are normal business concerns and are not specific to process heat decision making.

Barrier F: Inadequate information on the emissions profiles of products or firms

21. While information on the emissions associated with the manufacture of some products may change the behaviour of some consumers business is already in a competitive market and most are focused on business survival. The Association's experience is that most business

are conscious of their social responsibilities and want to be good corporate citizens but when there is otherwise only weak drivers need some assistance to make change. A stick approach may work in some cases but most business respond better to a carrot approach.

22. The Bioenergy Association works closely with a number of business who are seriously wanting to use low carbon fuels. The Association's experience is that only small assistance is required for any change to occur. The process heat programme needs to focus on providing assistance – this is low cost with potentially high benefit.

Barrier G: Some firms have poor information on their own energy use

23. The Association agrees that knowledge about energy use provides an essential base for any decision making with regard to process heat decision making. This is linked to Barrier F where a small assistance to business can motivate them to consider options. Unfortunately because of the relatively low level of adviser experience in the full range of process heat options some of the advice provided is not best practice. A key focus of the process heat programme needs to be on the upskilling of advisers. This is difficult as the cost of upskilling is often beyond the capability of advisers to fund. Low cost upskilling of advisers should be a priority for the programme.

Barrier H: Lack of information or aversion to new technologies

24. The Association agrees that “organisations do not have perfect information, particularly about new or emerging technologies, and engineering consultants can have a bias towards proven technology, i.e. what they know has worked in the past.” “Firms and consultants tend to be risk averse with regards to new energy efficiency technologies.” As for Barrier G the cost of upskilling advisers is often beyond their capability to fund. Low cost upskilling of advisers should be a priority for the programme.
25. Over the last decade EECA has funded many successful projects but there is very little information and learnings extracted and made available to other potential similar projects and their advisers. Lets learn from what we have already done.
26. **Q11-14** The informational barriers listed are a symptom of the barrier which is the cost of upskilling of advisers.

Barrier I: High cost of electrical energy relative to other high carbon fuels

27. The Association agrees that there is a major distortion in the energy market because “many of these cheaper [fossil] fuels have a higher overall cost to society when emissions, air quality and environmental impacts are considered, yet these impacts are not reflected in the prices of these fuels.” This failure within the market is a most significant reason why asset owners continue to wish to use fossil fuels instead of transitioning to low carbon energy such as from electricity or biomass – they don't have to pay all of the costs of their actions. This reinforces the need for government intervention to ensure that there is a balance of the costs and benefits to communities in which the projects co-exist.

Barrier J: Electricity supply is fundamentally more complex than other fuels

Barrier J1: Connection costs and the Transmission Pricing Methodology

Barrier J2: Time and costs associated with developing electricity connections and new generation plants

Barrier J3: Perceived risk of electricity supply disruptions

Barrier J4: Variable and uncertain emissions intensity of electricity use

28. The Association is encouraged that the consultation document recognizes the complexity of long term electricity supply as the points raised are similar to those generally raised for the long term supply of biomass fuel, but are not generally acknowledged. The Bioenergy Association is focused on reducing the complexity of biomass fuel supply so that electricity and biomass fuel supply are on a comparable footing with regard to long term supply and cost risk. This will allow a balanced analysis of the electricity and biomass energy process heat options.

29. In comparison of the relative complexity and uncertainty of using electricity the consultation document fails to compare electricity against the use of biomass fuel where:

- The biomass fuel supply chain is much more within the control of the heat plant owner. A willing buyer and seller is all that is required.
- The biomass fuel supply chain has less dependence on a national infrastructure with its rules, national quality requirements, and third party operator.
- Solid, gaseous and liquid biofuels are storable for use when required.
- The infrastructure for the supply chain can be designed and built within a short time period.
- If a contracted supply becomes of concern it is easy for the buyer to find another fuel seller.
- The buyer can negotiate quality, quantity and price according to their requirements and vary these to get 'a good deal'.
- Reliability of supply is between only the buyer and seller. In event of a contingency of supply an alternative supply arrangement can be quickly installed.

Barrier K: Electricity has historically been a 'last choice fuel' for industrial processes

30. Electricity has also been a last choice fuel because it is dependent relatively high price compared to the options.

31. The discussion document fails to address many of the broader issues around future electricity and natural gas supply. Current projections by Transpower are that if electric vehicles, process heat and general demand for electricity is to increase as is predicted that there will be a need for a large number of new electricity power stations to be built. The social and environmental effects of such a large expansion in the building of power stations needs to be considered alongside the social and environmental effects of climate change. Currently a number of Government policies and programmes are being looked at or adopted in "silos". The cross sector implications and opportunities of each is not being considered or discussed. An example is the 1billion trees programme which has taken no account of possible future uses of the biomass being produced. Currently a myopic approach of

sequestration appears to be the only goal yet with intelligent choice of species and location could turn this programme into a cornerstone for future energy, employment and regional economic growth.

32. **Q15-18** The Association agrees with the points regarding the electricity option as reflecting its members own experience with regard to large heat plant but at the low temperature applications eg space heating heat pumps, the summarized barriers don't apply.

Barrier L: The economics of biomass fuels is situationally dependent and complicated

33. The section on biomass energy is simplistic and fails to identify the specific issues that exist but could be addressed so that a low carbon economy could be achieved by 2050. However many of the issues identified in other parts of the discussion document also apply to biomass energy so policies which address those issues will also be applicable to biomass energy.
34. It is very disappointing that the discussion document focuses on the large scale heat plant where many of the issues raised are barriers because the low carbon fuel markets are still emerging. There are also very few large sized heat plant as most heat plant are in the small to medium scale range. A very different picture of the process heat market would be seen if the document had covered the process heat market fully.
35. It is disappointing that the document ignores the opportunities for using waste for process heat. Treatment of waste by anaerobic digestion to make biogas for process heat is a proven technology and waste is readily available. Food processors have an opportunity to adopt circular economy principals to their business and use their organic wastes to produce their on-site energy. This is a significant gap in the consultation document.
36. Point 93 – “outside of the wood processing sector, using woody biomass as a process heat fuel instead of fossil fuels is relatively rare.” Is not true. There are hundreds of customers of wood fuel suppliers who are outside the wood processing sector.
37. The Association would disagree that “A key barrier is that the economics and implications of using biomass fuel can be far more complicated than fossil-fuel alternatives especially at scale. For example, there are differing grades and types of woody biomass fuel and each grade has differing availability, cost, and handling characteristics (ease of use).” Coal has exactly the same issues. The difference is that the coal supply market has addressed these many years ago while the biomass supply market is still evolving. Biomass is easy to process into the required grades so it is not a barrier – like coal just a task to be done.
38. The Association agrees that biomass fuel availability and cost is location-specific however this is similar to coal and geothermal. The low energy density of some biomass fuel (but not wood pellets) compared to coal means that the cost may be significantly different the further the biomass fuel has to be transported. This is a cost issue but not a barrier. The density and CV of wood pellets can exceed coal in many instances and it is already transported long distances from Invercargill to Auckland with suppliers located throughout the country.

39. Point 96 is misleading as biomass fuel supply contracts can be met in the similar manner that is done for coal. Sourcing of biomass is a long term function and biomass is generally sourced according to demand and the time frame for processing and delivery. The biomass will be sourced so that cost is minimized and stockpiled until needed. Biomass at Kinleith Mill was stockpiled for many years before it was recovered and used as fuel. Many points raised in this document are not barriers – just tasks to be done similar to what coal, gas and electricity suppliers and users have to do.
40. Point 97 – long term contracts (up to 10 years) are available from some biomass fuel suppliers.
41. Point 101 is a misunderstanding of the biomass fuel supply sector. Biomass fuel suppliers manage the complexity of sourcing and processing into contract specified fuel. The purchasers of biomass fuel will generally always contract out to specialist fuel suppliers and not engage themselves with others. This applies for large and small plant owners and is also how the coal, gas and electricity market works.
42. The association agrees that the range of factors listed can make it difficult to determine the best approach to transitioning from use of fossil fuels and that these complexities mean that there is a high transaction cost in obtaining adequate information about the true costs and risks, and therefore the viability, of switching to processes and technology that use woody biomass. However this is a simple market information issue and the Bioenergy Association has been working to address it. Assistance from a process heat programme would extend and speed up the current activities.
43. The lack of consideration of the forestry and wood processing sector as a cornerstone of producing residual biomass ideally suitable as an energy fuel is similarly not addressed. Currently the export of unprocessed logs means that New Zealand is also giving away a major potential source of energy fuel.
44. The sourcing of biomass for fuel from shelter belts, riparian planting and erosion control etc should also be part of the discussion on making agriculture and horticulture carbon neutral. Integrating energy production and use as part of land use can improve the business resilience of farming and crop production.
45. The analysis show that the transition of 24.6PJ of energy can be achieved but will take the full period out to 2050 for many of the reasons identified in the consultation document. However the issues to be addressed are also reasonably easy and low cost provided government and industry continues to work in collaboration.

Barrier M: Biomass supply chains are undeveloped and face development difficulties

46. The Association agrees that bioenergy can be used for large scale plant and this will provide economies of scale but if the discussion document had included the smaller heat plant it would be obvious where the opportunities to transition from use of fossil fuels is easiest. By focusing only on large heat plant the discussion focused on the most difficult issues and ignores what is immediately achievable.

47. Point 20 “Almost all bioenergy is used in the wood, pulp and paper manufacturing sector, where residues from processing operations can be recycled as fuel.” Is not accurate. There is a fast growing and successful use of biomass fuel by heat plant owners who do not have access to their own fuel but must purchase it. There is a network of biomass fuel suppliers who adequately meet current demand for purchase of fuel.
48. Point 30. Where a heat plant facility has many years of useful life ahead and so will not be replaced for some time the option of cofiring is a real option and a possibility in most cases.
49. The Association agrees that “A lack of demand has hindered the development of a wood fuel supply chain in New Zealand beyond the wood processing sector.” and that “Supplying large amounts of fuel requires significant capital investment in equipment (i.e. trucks and heavy machinery). A fuel supplier is unlikely to make these investments in the absence of a long-term supply contract.” That is why the Association has focused on the small/medium sized heat plant so that there is a demand pull to biomass fuel suppliers. This approach has been very successful and the current biomass fuel producers have established a network of suppliers throughout the country in response to demand. It is expected that this growth of the fuel supplier network will continue in an orderly fashion as the demand for fuel grows.
50. With central and local government owning 52% of the heat plant which could convert to using low carbon fuels a focus on transitioning these smaller facilities would create a demand pull for biomass fuel suppliers. Subsequently the market would grow so that the supply market is resilient enough to encourage large heat plant owners to transition to use biomass fuels. This is an opportunity for the government to show leadership and demonstrate seriousness about reducing greenhouse gas emissions.

Barrier N: Air emissions regulations

51. The Association agrees that the air emissions regulations are a barrier and this needs to be addressed. However this is just one of the many issues which are of a similar nature and the programme should include. It is a good example of where a lack of attention to detail by regulators and a lack of policies have resulted in the bioenergy and biofuels market not being able to reach its potential as quick as is now desired.
52. The Bioenergy Association has collated lists of the issues similar to the air emissions regulations which need to be addressed if progress on transitioning process heat from coal to biomass fuels, and production of energy from waste is to be achieved by 2050. The lists have been provided to officials and are available at:

<https://www.bioenergy.org.nz/documents/resource/Information-Sheets/IS46-Actions-to-reduce-use-of-fossil-fuels-for-process-heat.pdf>

<https://www.bioenergy.org.nz/documents/resource/Information-Sheets/IS45-Actions-to-reduce-methane-emissions-from-waste181203.pdf>

Barrier N should be extended to cover the whole list of issues which need to be addressed and not just focus on one of the issues.

53. **Q19-22** The Bioenergy Association has identified that the largest barriers to the use of biomass for supplying heat are:

- that energy policy has been focused on electricity and heat has been ignored. There is therefore a backlog of market issues which need to be addressed. These do not require research or extensive funding but applied application.
- Within government, discussion on the process heat market is still focused on electricity solutions and there is little and only superficial interest in the use of biomass energy. This is demonstrated in this discussion document where there are 21 points relating to electricity and 12 related to biomass energy solutions.
- That this is the first effort by Government to try and understand the process heat market.
- Government has not previously responded to what the heat sector has been saying for the last decade so there is a backlog of listening and discussion required.

Self-generation from renewable sources

54. **Q23-24** The discussion in points 103-106 is a good example of where the major barriers are with regard to process heat. The discussion (including in the title) focuses on electricity and not self production of process heat. Addressing heat will require a mind set shift from electricity to energy.

55. Food processors require heat which many are able to self produce by treatment of their organic waste. The anaerobic digestion of organic waste produces biogas using proven technology and which can be used directly in boilers for heat or can be used in a cogeneration application producing both heat and electricity for on-site use. The economics of production of heat from waste is very attractive and the barrier to greater use is mainly because there is a lack of role models for potential investors and Government policies always ignore the opportunity.

Regards



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