Submission on APP-2020203133.00 - Bio Plant Manawatu NZ Limited

Submission of the Zero Waste Network Aotearoa

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- Our submission relates to the whole application.
- We **oppose** this application. We want the Horizons Regional Council to **decline this application**.
- We would like to be heard in support of our submission.

The Zero Waste Network Aotearoa: Who we are

Founded in 2006, the Zero Waste Network is a national, not-for-profit umbrella organisation of 130+ members. Our members include community enterprises involved in the promotion or practical implementation of zero waste, waste minimisation, resource recovery/circular economy, environmental education, resource efficiency, resource conservation, local employment and local community development. We deliver resource recovery training to the sector, support community enterprise development, and advocate at the local and national level on issues like increasing the waste levy and mandatory product stewardship.

Our members are involved at the frontline of resource recovery and waste minimisation everyday. Collectively, our members employ 1200+ people, recover 32,000+ tonnes of material each year and feed $73+ million dollars back into local economies through our enterprises.

As an example, Xtreme Zero Waste, based in Raglan, is one of our members. Facing the closure of their landfill in 1998, the community began to research alternatives to landfilling. Xtreme opened in 2001, and immediately began diverting 70% of the community's waste from landfill. In 2022,

Xtreme now diverts 78% of materials from landfill and employs 40 people. This has resulted in an economic benefit of $22-34 million for the local community.

The Zero Waste Network's mission is to:

- connect and empower a network of zero waste community enterprises across Aotearoa
- inform policy and procurement
- trial and deliver zero waste solutions

The Zero Waste Network is based in Auckland and Wellington with board members spread across Aotearoa. For more info: https://zerowaste.co.nz

Significance of the BioPlant application

New Zealand does not have any Municipal Solid Waste (MSW) pyrolysis facilities nor any Waste-to-Energy facility of any type designed to process MSW. Pyrolysis facilities that process municipal solid waste (mixed rubbish) are uncommon; very few pyrolysis plants that use MSW as feedstock are operating in Europe or in the United States.[1] The Government of Canada notes, "*Pyrolysis is a marginal technology that is almost never used. Limited information can be found regarding the performance of the technology.*"[2] The evidence base is insufficient to guarantee its safety so the precautionary principle should be used when assessing the application. Equally, there are gaps and inaccuracies in the supporting evidence supplied by BioPlant.

BioPlant does not have any operational facilities anywhere in Australasia, and very few anywhere else in the world. This is experimental technology. BioPlant has no waste or resource recovery operations in New Zealand. None of the company directors, board members or engineering team have any experience in the NZ waste sector.[3]

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[1] "In the United States, with a few exceptions, facilities currently using these pyrolysis and gasification technologies for these purposes are most often operating in a demonstration mode and do not have waste contracts and/or energy or product contracts in place that would indicate a full-scale commercial operation. Because most facilities are currently only demonstration or pilot-scale plants, they are likely operating in batch-test rather than in a continuous-mode that would be typical of commercial plants." See Potential Future Regulation Addressing Pyrolysis and Gasification Units. A Proposed Rule by the Environmental Protection Agency

[2] See *Fact Sheet: Pyrolysis.* 2018. Prepared by Josée Thibodeau, M.Sc, National Research Council. Government of Canada.

[3] See BioPlant's Board of Directors and engineering team: Meet Our Team

Adopting overseas models that have been implemented in contexts significantly different to that of NZ must be approached using the precautionary principle.[4] As a technology still under development, MSW pyrolysis relies upon a strong regulatory environment, including real time environmental emissions monitoring, to ensure operational safety and compliance. Given the absence of this technology in New Zealand, few territorial authorities have the capacity, technical knowledge or regulatory framework in place to ensure safe operation of such facilities, if indeed, that is even possible.

We are concerned that the company, BioPlant, has exaggerated the benefits and downplayed the risks of their proposal. We consider several of their central environmental claims to be inaccurate and misleading, and amount to 'greenwashing'. We identified numerous inconsistencies and blatant falsehoods among the consent application and supporting documents that deeply concern us.

In particular, BioPlant consistently uses terms that are associated with being environmentally friendly, which the specifics of their technology and application do not back up. These claims include:

- The facility will produce 'renewable' energy, despite the primary feedstocks being non-renewable fossil-based materials such as plastics - their consent application itself acknowledges that their energy production is "not strictly a "renewable" resource in the commonly understood sense" (p.49).
- The misuse of the notion of 'renewable' energy also applies to the description of the fuel output as 'bio-diesel' and 'green diesel'. Again, biodiesel is produced when biomass is the feedstock, whereas the use of plastic and MSW feedstocks will result in 'synthetic' diesel akin to mineral diesel (i.e. fossil fuel).
- The facility will produce 'biochar', a valuable soil amendment product. Instead, using plastics and MSW as primary feedstocks will produce char (along with the oils and gases) that is highly contaminated when pyrolysed. This plastic char is very different to biochar and in no way suitable for the same uses. It is also not CO2 neutral - a property of biochar and not fossil-based char. The Viroment Technologies technical report (document 23) outlines that testing is still required to determine the chemical characteristics of the char, which it states "If not feasible [to use for soil application] will dispose to landfill as deemed suitable by characterisation" (p.10)

[4] Proposed changes to the Resource Management Act are anticipated to explicitly contain direction to use the precautionary principle. See section 18 of the Exposure Draft of the Natural and Built Environments Bill

- The facility will result in net savings of tens of thousands of tonnes of greenhouse gas emissions. There are substantial and obvious holes in their carbon calculations that we discuss in this submission, raising the possibility that the facility might instead be a net contributor of GHG emissions.

This use of 'greenwashing' may have led representatives of Manawatū District Council, local iwi Ngāti Kauwhata, members of the public and other stakeholders to support this proposal where they may otherwise not have, had they been provided fuller information and analysis of the proposal. Our concerns about BioPlant's dissemination of inaccurate and incomplete information extend to whether the risks and environmental effects of the proposed facility have been adequately and comprehensively assessed thus far by the Regional Council and the independent assessment by PDP.

Defining pyrolysis as incineration

The European Union and the US Environmental Protection Agency both define pyrolysis as a form of incineration (USA 40 CFR §60.51a; EU Directive 2010/ 75/ EU Art 3.40). The key rationale for this definition is that while pyrolysis uses a different technical and physical process (e.g. lower temperature, absence of oxygen) than direct/conventional incineration, the outputs of pyrolysis are subsequently incinerated, and thus similar emissions and pollution effects occur and similar controls are required.

Our objections to the application

We are opposed to this proposal for the following reasons:

1. The objection by the Aorangi Marae Trust
2. The negative effects of emissions of carcinogenic dioxins and furans, particulate matter, odour, and wastewater on the local community and environment.
3. The creation of hazardous waste where none exists in the feedstock
4. The contribution of additional CO2 emissions to the atmosphere
5. The linear approach for dealing with hard-to-manage resources at the end of their useful life does not support the transition to a circular economy

We deal with each of these matters in turn below.

Objection by the Aorangi Marae Trust

Aorangi Marae is the marae for Tahuriwakanui hapū of Ngāti Kauwhata. It is one of the marae closest to the proposed BioPlant pyrolysis facility.

The Aorangi Marae Trustees, who manage the marae, were neither informed nor consulted about this application, and do not support it.

Under Sections 7 and 8 of the RMA, Horizons must have particular regard to kaitiakitanga, and must take into account the principles of the Treaty of Waitangi. The principles of the Treaty of Waitangi include the duty of the Crown and Māori to act reasonably and in good faith and the duty of the Crown to actively protect Māori interests and make informed decisions.

In seeking to act in good faith, it is incumbent upon Horizons to actively protect the interests of Aorangi marae and its ability to exercise their kaitiakitanga over the lands, resources and waters that surround it. We support them in their efforts to do so.

The negative effects of emissions of carcinogenic dioxins and furans, particulate matter, wastewater and odour on the local community and environment

The Regional Council must not grant resource consents for discharges that contain, or result in the production of, environmentally persistent hazardous chemicals or hazardous chemicals that will bioaccumulate to a level that has acute or chronic toxic effects on humans or other non-target species. (*Policy 3-13: Regulation of hazardous substances*, *One Plan*)

Inadequate and contradictory data and information

We are concerned that there is inadequate detail in the information provided to evaluate both the quantity and the composition of the emissions generated by the proposed facility. Some of the information provided is contradictory.

BioPlant indicates that it plans to use a semi-dry ion exchange system to scrub emissions. We note that both their illustration Schematic diagram of a single line and s92 response lists a “wet scrubber” which is a different system with different waste streams, benefits (in terms of emissions) and drawbacks.[5]

[5] See *“Table 1.1: Comparison of Wet and Dry Scrubbers” in Wet and dry scrubbers for acid gas control. Section 5. US Environmental Protection Agency, 2021.*

Further confusion arises from BioPlant's responses to a s92(8) question regarding maintenance. BioPlant states that, "A Preventive Emissions Management System (PEMS) is designed into the emissions management process," but there is no documentation of such a system provided. (As an aside, the 'P" in PEMS stands for *Predictive*, not *Preventive).* Instead, Horizons is simply supplied with "Example Performance Specifications" for a PEMS, not documentation of an actual or proposed PEMS. There is no mention of a PEMS in the body of the BioPlant application. To evaluate the effectiveness of a PEMS, Horizons would require some knowledge of the particular PEMS system being proposed by BioPlant.

The various descriptions of gaseous emissions treatment processes and flows are at times unclear and contradictory. On page 8 of the BioPlant application the company says combustion emissions are scrubbed twice: "*gas burnt on site is contained and sent through the ion exchange scrubber before release to atmosphere. As described in more detail in the process, the gas produced by this plant goes through a scrubber and de-sulphur element before it is combusted. The captured exhaust then* ***goes through a second water washer and de-sulphur element*** *before it is released to atmosphere*." Yet there is no further detail of this second process in the application. In one sentence above, it is talking about "gas burnt on site" and in the next it says, "gas produced by this plant".

On page 14, the company says, "Typically, 10% to 15% of the purified syngas is redirected to the pyrolysis chamber for this purpose in the steady state operating mode." The remaining 85-90% of the synthetic gas is turned into synthetic diesel, and on page 14 it says "After the purification process, the gases from the separator continue to the oil production line…" suggesting that there is scrubbing of all of the syngas, and then subsequently in the same paragraph, "Any sulphur and nitrogen present in the hydro-cracking feedstock are, to a large extent, also hydrogenated and form gaseous hydrogen sulphide (H2S) and ammonia (NH3) which are subsequently removed in the scrubber." Page 1 of the Technical Report says, "The scrubbing and cleaning of the air emissions to the atmosphere **is only applied to the combustion products of the syngas burners**," and the illustration of the process on page 2, 'Twin Chamber Hybrid Process Flow', does not indicate any post-hydrocracking scrubbing.

It is not clear where or how the gaseous outputs are subjected to some secondary round of post-hydrocracked scrubbing. It isn't clear if this second round is the same as or a different process

to the secondary process for the combusted gas. There is no analysis or evidence of whether the scrubber technology employed is appropriate for processing the hydrocracking emissions. It also fails to address how water would be captured or disposed of if in fact some further water wash is conducted.

There are a range of factors affecting the performance of dry/semi-dry scrubbers that include fabric type and weave, air-to-cloth ratio (gas flow rate to total bag surface area), cleaning method and frequency, bag cake formation and maintenance, and bag integrity with respect to mechanical, thermal, and chemical breakdown. The fabric type must be matched to the temperature range of the application and the chemical composition of the gas for good performance and bag longevity. Maximal air-to-cloth ratio for good performance is also a function of fabric type and weave. The method, intensity, duration, and frequency of the bag-cleaning cycles are important to maintain mechanical integrity of the bags and good cake formation.

There is no significant documentation of the ion exchange scrubbers, nor discussion of a maintenance schedule. We are concerned that the proposed scrubbers and baghouse are inadequate for both the quantities and composition of outputs.

Dioxins, particulate matter and other modelled emissions

Along with the confusion relating to the scrubbers and PEMS, we are concerned that there is inadequate consideration of the impacts of dioxins, particulate matter and odour emissions.

We discuss these concerns below.

We note that the PDP Technical Review indicates that (section 9.2 Combustion Emissions) the methodology that is used to determine the levels of emissions of polluting gases was:

1. Not standard practice in New Zealand
2. “may not represent the worst case scenario.”

The BioPlant Technical report has no actual data relating to its facilities nor any modelling on dioxin emissions. Instead the technical report (document #23, p8) says clearly that the measurement for dioxins and furans was sourced from an academic study into gasification and is therefore neither specific to pyrolysis nor to the particular technology on offer. As a result we have no confidence that the application reflects an accurate accounting of dioxin emissions. The very short description and image of the ion exchange scrubber provided in the application (p60) notes that ‘*no removal efficiencies for dioxins were supplied*.” Compounding concerns is the PDP technical

review (p6), which takes at face value the dioxin values offered by the company, uses as a baseline standard for safe levels of dioxin from the US state of Texas instead of a jurisdiction more closely aligned with New Zealand, and uses a unit of measurement different from a Toxic Equivalency Factor (TEF) which is the standard measure used for regulatory and risk assessment of the toxicity of dioxins. Dioxins bioaccumulate in humans and animals, and biomagnify up the food chain. Given this, ascertaining accurate and reliable measurement of dioxin toxicity and concentrations needs to include this complexity over time.

Furthermore, New Zealand responsibilities under the Stockholm Convention require the *prohibition and/or elimination of the production and use, as well as the import and export, of intentionally produced Persistent Organic Pollutants (POPs) including dioxins.*[6] Given that this pyrolysis facility would intentionally produce dioxins where none exist in the feedstock, it is directly contradictory to New Zealand's international obligations.[7] This is a matter that should have been raised as part of PDP's Review.

In terms of particulate matter (PM10 & PM2.5) and other modelled emissions (Nitrogen Dioxide, Sulphur Dioxide etc), the materials provided in BioPlant's Technical Report raise further concerns about accuracy and reliability. The Technical report (document #23, p5) says BioPlant's numbers are, "*Based on the dispersion modelling done for a similar hybrid pyrolysis plant in Dandenong South, Victoria, with actual stack emissions data from a similar operating pyrolysis plant in Korea, the results for the contaminants discharged to the air is shown in Table 1.*" There is no clarity about which particular "*similar pyrolysis plant in Korea*" (p4) or "*reference sites in Korea*" (p8) that the Technical Report refers to as the basis for these figures; are these are averages, medians or estimations of several plants or actual data from one site? Of particular concern is the circular reasoning about the accuracy of this modelling and data made by PDP (pp4-5) in their Technical Review saying: "*The applicant has not provided copies of the model set up files therefore PDP has not been able to verify that the model outputs are correct. However, the modelling results presented are consistent with the modelling results presented for the Australian plant, and therefore PDP considers that the modelling has been undertaken appropriately.*" PDP has assumed that this data and the modelling is correct because the company has said it is correct, and because the company provided the same materials in Australia. There is

[6] The Stockholm Convention came into force in 2004. An overview of the terms can be found here: http://www.pops.int/TheConvention/Overview/tabid/3351/Default.aspx

[7] A complete list of POPs to be eliminated by New Zealand i available from the Ministry for the Environment's website here: https://environment.govt.nz/assets/publications/International-action/table-pops-description-use-nz_0.pdf

no independent verification of the modelling or the data. Given that no detail about the model or the data has been provided, it would be impossible to undertake such verification. We simply cannot afford to take this at face value: the implications for community exposure are too great.

Odour

Horizon's *One Plan* alludes to the importance of critically evaluating claims about odour emissions in relation to consent applications because, "*Odours, smoke and dust have dominated complaints received by the Regional Council for some time, making up more than half of the complaints received between 2000 and 2004*" (Sec 7-1). Needless to say, residents are concerned about bad smells.

The BioPlant application (p11) says "*The addition of the BPMNZ plant within the Resource Recovery area and neighboring wastewater treatment sites is considered to have no additional or adverse effects on the neighboring residents*." There are already adverse effects of the neighbouring residents from these facilities, and the addition of <u>any</u> further odour and emissions, however small, will add to those effects. There are residential houses within close proximity of the proposed site. The PDP Technical Review says (Sec 7.2) that the Air Dispersal Study was "based on monitoring at an Australian site that handles MSW." The data relating to odour is not specific to a pyrolysis facility. Instead, generic data relating to a "facility that handles MSW in Australia" is used. The air dispersion modeling used by BioPlant is not that usually used in New Zealand. Again, the PDP Technical review has said (section 8.42) that the modelling set up has not been provided to them. They have simply assumed it was correct. The BioPlant Air Dispersion study (p9) notes, *"There are no odour sampling analyses available from these sites as this is not something that has been required of the plants in operation overseas."* This is not an adequate assessment or analysis of the impacts of odours.

As importantly, Horizon's questions about the size and capacity carbon filter system proposed for the plant have remained unanswered by BioPlant. Document #4, q5 on the consents page asks "*The application mentions activated carbon filtration to be used for managing odours. We could expect the technical expert requesting the sizing details and calculations for these filters to ensure they are appropriately sized."* BioPlant simply refers back to the product specifications and documents already provided, raising concerns that if consent is granted, they will prove to be inadequate to meet requirements. Finally, the PDP technical report (p5) concedes that their conclusion that BioPlant odours would, *"meet the regional odour standard and should not result in off-site odour nuisance,"* was entirely predicated upon *"there being no fugitive odour emissions from the operation,"* which is statistically impossible to guarantee.

Water

Insufficient information and assessment of potential environmental effects of the wastewater has been provided. In all of the documents, including the full consent application and technical review, only a very basic description of the on-site wastewater facility has been provided. While up to 70% of the treated wastewater is to be reused on site, the remaining 30% will be discharged to the sewerage system to be processed at the Manawatū District Council's municipal WWTP (which has itself been the subject of criticism due to non-compliance). The company and technical review only provide a simple verbal assurance that this wastewater discharge will meet the trade wastewater requirements, without any analysis of how they will meet these requirements or whether a permit has been granted by MDC.

We believe that the potential environmental effects of the wastewater system require greater scrutiny, particularly as some of the water that will be treated on-site will have been used in the air pollution control systems, including the gas scrubber. It is not clear what hazardous substances (such as dioxins, furans, PAHs etc.) may be present in the untreated water and whether the onsite treatment will adequately remove these substances before the wastewater is discharged.

The creation of hazardous waste where none exists in the feedstock

Production of hazardous char

Using pyrolysis to dispose of municipal solid waste (mixed rubbish) creates a form of char that is fundamentally different to the 'bio-char' which is derived from clean organic materials and can be safely added to soils. Germany has defined the char from Municipal Solid Waste pyrolysis as hazardous waste that must be handled in accordance with strict regulations:

> *"From 1983 to 2015 a MSW pyrolysis plant operated at Burgau, Germany, despite continuous technology related weaknesses; and no other plant of its type has been built since (Vehlow, 2016). The feed-stock was pre-treated and residual char had to be disposed of as hazardous waste (Quicker et al., 2015)."*[8]

[8] Rollinson, A.N., Oladejo, M.S., 'Patented blunderings', awareness, and self-sustainability claims in the pyrolysis energy from waste sector. *Resources, Conservation & Recycling 141 (2019) 233–242*. The specific reference within this article to the treatment of pyrolysis char as hazardous material is from Quicker, P., Neuerburg, F., Noēl,Y., Huras,A.,2015. *Status of Alternative Techniques for Thermal Waste Treatment-Expert Report for the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, Project No.Z6-30345/18, Report No. 29217, English Translation*: Bār, H. Rheinisch-westfälische Technische Hochschule Aachen Unit of Technology of Fuels (TEER) Wüllnerstraße252062Aachen.

The BioPlant pyrolysis facility will produce an estimated 2.5 tonnes/day of 'char', the residual material left following the pyrolysis process. This material is primarily comprised of volatile matter[9] (51.40%) and fixed carbon (46.03%). The Technical Report indicates that it will contain heavy metals (Document #23, p10). The BioPlant application (p19) calls this material "biochar" and suggests it is a desirable soil conditioner saying:

> *"The addition of bio-char to agricultural soils is receiving much attention due to the benefits to soil quality and enhanced crop yields, as well as the potential to gain carbon credits by active carbon sequestration. Studies have shown that bio-char can aid in: Nutrient retention and caption exchange capacity, Decreasing soil acidity, Decreased uptake of soil toxins, Improving soil structure, Nutrient use efficiency, Water-holding capacity, Decreased release of non-CO2 greenhouse gases"*

The NZ Biochar Research Centre based at Massey University defines biochar as: "a 2,000 year-old practice that converts agricultural waste into a soil enhancer that can hold carbon, boost food security and discourage deforestation." We do not consider the char generated by the pyrolysis plant suitable for returning to soil. The heavy metal content alone makes it unsuitable for this.

BioPlant ltd is either mistakenly or deliberately seeking to present this toxic waste product as a beneficial soil conditioner. This would enable them to get rid of their hazardous waste easily, while avoiding responsibility. Their waste would be applied to soil absent any monitoring of the disposal locations and impacts, and free of regulation.[10]

If this approach is accepted by Horizons, the benefits would accrue to the company and the costs would accrue to society and the environment. Even allowing this practice via a consent would almost certainly lead to future socialisation of both the environmental and fiscal costs of remediating potentially irreversible harm. BioPlant's attempt to offload the problem of their waste by-product

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[9] See *Characterization and Utilization of Char Derived from Fast Pyrolysis of Plastic Wastes*, Procedia Engineering Volume 69, 2014, Pages 1437-1442. Procedia Engineering | 24th DAAAM International Symposium on Intelligent Manufacturing and Automation, 2013 | ScienceDirect.com by Elsevier

[10] The similar process of 'landfarming' that involves the disposal of drilling waste from oil and gas production facilities either on land surfaces or buried and covered is considered a controlled activity by the Taranaki Regional Council in its Regional Plan, which means a resource consent is required to undertake this activity. The council has applied various conditions on its resource consents. These include restrictions on proximity to ground water, concentration and depth of application and monitoring and notification protocols. See *Ministry for Primary Industries Guidance on spreading rocks and minerals from drilling oil and gas wells on land*

onto the public purse is clearly out of step with the growing expectation of product stewardship and corporate responsibility.

We note that BioPlant Limited has not made any application for resource consent for discharge-to-land of this material, and further, suggests elsewhere in its application (section 3.3, p19) that the residual char could be burned as a solid fuel or on-sold with regulatory compliance for its use transferring to another party. We suggest Horizons makes every effort to understand the nature and composition of the char that would result from the pyrolysis of MSW. This is in line with the precautionary principle. Allowing this material to be disposed of to land, with or without resource consent, is likely to result in long term soil quality issues with flow on effects for agricultural and horticultural land uses.[11]

Contaminated oils

The application provides very little information on the refining processes to turn condensable pyrolysis gases/oils into usable diesel. Aside from concerns about how energy intensive these processes may be, Kusenberg et al. (2022) have recently demonstrated the significant barriers facing the refining of plastic-based pyrolysis oils into safe, usable resources due to high levels of contamination.[12] This not only has implications for how on-site emissions and contaminants from these refining processes will be managed (discussed in the previous section), but for the potential for off-site pollution when the synthetic diesel is combusted. None of these issues have been addressed in the resource consent application.

Sludge residue

On page 21 of the BioPlant application, they indicate that, "Any sludge residues from the treatment plant will be reprocessed via the pyrolysis unit." Yet the process cannot completely eliminate sludge residues irrespective of how many times they are subjected to pyrolysis. Over time, the quantity of this sludge will grow, along with likely increasing concentrations of contaminants from the feedstock

[11] Poorly managed disposal of waste products to land is resulting in significant issues for producers in overseas markets, see: https://www.theguardian.com/environment/2022/mar/22/i-dont-know-how-well-survive-the-farmers-facing-ruin-in-americas-forever-chemicals-crisis

[12] Marvin Kusenberg, Andreas Eschenbacher, Marko R. Djokic, Azd Zayoud, Kim Ragaert, Steven De Meester, Kevin M. Van Geem. 'Opportunities and challenges for the application of post-consumer plastic waste pyrolysis oils as steam cracker feedstocks: To decontaminate or not to decontaminate?' *Waste Management*, Volume 138, 2022, Pages 83-115, ISSN 0956-053X, https://doi.org/10.1016/j.wasman.2021.11.009

and generated by the pyrolysis process itself. No sludge residue features in the overall waste disposal inventory (Document #23, p10).

Disposal of the waste from the ion exchange scrubbers and filters

BioPlant is proposing to use a semi-dry ion exchange system (though we note that both their illustration Schematic diagram of a single line and s92 responses seems lists a "wet scrubber" which is a somewhat different system) coupled with a baghouse to remove contaminants from the synthetic gas that is burned to power the pyrolysis process (p 33 of the application). The technical report (p10) indicates that 66 tonnes of fly ash will be produced per year. We note there is no mention of the disposal of tars and other chemical cleaning agents typically associated with pyrolysis facilities.

Contaminated land

The BioPlant application contains no information about discharges to land, yet there are significant waste streams that could involve long term onsite storage (including the residual char, fly ash, chemical cleaning agents). There is the very real prospect that over the long term the community could be faced with remediating the Kawakawa site due to contamination, as has happened with 54 gasworks/former gasworks sites in New Zealand.[13]

The production of gas by way of gasification from coal was a major source of fuel for heating, cooking and lighting. Gasification and pyrolysis are similar processes, the primary difference being that the pyrolysis process thermally degrades waste in the absence of air (and oxygen). Gasification is a process in which materials are exposed to some oxygen, but not enough to allow combustion to occur.

These gaswork sites across New Zealand are now contaminated land. The gasification of coal and the pyrolysis of MSW have similar emissions profiles in terms of particulate matter, reduced sulfur and nitrogen compounds, and hazardous air pollutants (HAPs) including polycyclic aromatic hydrocarbons (PAHs). Equally well, they have similar residual waste streams including char/coke, tar and wastewater.

This type of activity falls squarely within the Ministry for the Environment's Hazardous Activities and Industries list (2011) under two categories:

[13] See Ministry for the Environment. Guidelines for Assessing and Managing Contaminated Gasworks Sites in New Zealand. https://environment.govt.nz/assets/Publications/Files/gas-guide-aug97-final.pdf

- A7: Gasworks including the manufacture of gas from coal or oil feedstocks
- A13: Petroleum or petrochemical industries including a petroleum depot, terminal, blending plant or refinery, or facilities for recovery, reprocessing or recycling petroleum-based materials, or bulk storage of petroleum or petrochemicals above or below ground

While the management of industrial sites, expectations of regulation, understanding of environmental impacts and technological changes mean that a facility built today is unlikely to experience the same degree of contamination as the original gas works sites, the BioPlant facility will produce highly toxic hazardous waste streams from materials that are not, prior to pyrolysis, hazardous.

Horizon's *One Plan* has recognised the danger of the production of additional toxic waste streams in the region, noting in Issue 3-5:

> *The increasing production of waste* and use of hazardous substances* in the Region has resulted in:*
> *(i) wasted resources and an increasing need for appropriate disposal*
> *(ii) potential for the unsafe use, storage, disposal and transportation of hazardous substances**
> *(iii) potential for land becoming contaminated to the point it poses a risk to people and the environment.*

BioPlant's proposed pyrolysis facility will produce problematic waste streams and the management of these hazardous substances will pose a significant risk of land contamination if improperly disposed of. We expect that Horizons will carefully examine the claims and evidence of the applicant and do the necessary due diligence, including seeking independent expert advice, so decision making is based on a sound understanding of the chemistry, toxicity and the likely effects of the wastes created. It is critical that Horizons is able to assure itself and the wider public that the waste streams created and the disposal methodologies are safe for people and our environment.

Climate change: The contribution of additional CO2 to the atmosphere from BioPlant

Horizons' *One Plan* takes climate change into consideration in a number of areas within the planning document, noting it is, "an overarching issue for the regional community and touches on many of the keystone issues." Climate change is clearly an issue of significant and growing concern for the Council who advise taking a precautionary approach to establishing or intensifying land

use in areas that may be subject to the effects of climate change (see Sec 9.1 of the *One Plan*). Large portions of the area in and around Feilding are already at risk of flooding.[14]

Regional and Local Government have an important role to play in both mitigation and adaptation strategies to address climate change. At the heart of our climate change response is the responsibility to reduce or eliminate the causes of climate change, in particular the release of greenhouse gas emissions.

The clear intention of central government is to make it possible for Councils to take climate change into account when assessing consent applications. Under sections 35 and 36 of the Resource Management Amendment Act 2020 (RMAA20) sections 70A, 104E and 104F of the RMA will be repealed on 31 December this year. The New Zealand Law Society writes:

*"With these sections removed, the previously binding Supreme Court authority, which had hinged on these sections, will no longer apply. When deciding whether or not to grant consent, or to adopt new rules and policies governing consents, the resulting effects on climate change will no longer be out of bounds for councils… **steps taken or not taken to lessen or counter the atmospheric build-up of greenhouse gases will for the first time have real legal consequences for whether planning and environmental approvals can be obtained or not."***

This suggests that Horizons will soon be expected to take a proactive approach in assessing the impacts and effects of emissions as part of its consenting processes. In relation to the BioPlant proposal this would mean looking carefully at the emissions implications of the proposal over the next 30 years. Applying the precautionary principle requires consideration of a 'do nothing' option where there is a possibility that granting a resource consent for an activity is likely to cause harm in the short, medium and/or long term. The window for reducing emissions is very short, we cannot afford to grant consent to activities that do not support the rapid transition to net zero carbon.

Drivers for reducing methane emissions

Waste disposal is a significant contributor to New Zealand's overall emissions. About 4% of all New Zealand's Greenhouse Gas (GHG) emissions are biogenic methane from organic waste breaking down in landfill. The Climate Change Commission has recommended an ambitious target of at least 40% biogenic methane emissions reductions by 2035 (approx 30% by 2030). We expect this target will be carried through into the government's Emission Reduction Plan due to be released in May 2022.

[14] Based on Horizons' LIDAR floodplain mapping tool

A key focus is collecting and processing organics in such a way that they can safely be returned to soils to protect, enhance and restore the quality of New Zealand's soil assets. One part of this work is ensuring organic material returned to soil does not contain additives that could be toxic to soil or human health or that do not biodegrade (eg. plastics). As discussed earlier it is critical that 'solutions' to problems in one part of the system do not create problems in other parts, for example swapping methane emissions for CO2 emissions or polluting land through ill conceived application of waste products to soil.

This 40% target is already driving changes in policy, regulation and legislation around waste minimisation. MfE has just issued its Transforming Recycling discussion document which indicates that separation of food waste will become mandatory for households and businesses. Government's current proposals would make it mandatory for food waste to be collected separately by 2025 in areas with existing infrastructure and by 2030 in areas where composting and other infrastructure needs to be developed.

This means that over time organics will gradually be removed from Manawatū's residual waste stream as a range of policy instruments come into play. Manawatū's waste will cease to produce methane, because it will no longer be sending organic waste to landfill. This has two main implications for the BioPlant proposal: firstly the organic fraction of the waste stream will get smaller over time. Secondly should the BioPlant facility go ahead, it will generate significant CO2 emissions from the burning of non-organic feedstock.

Misleading claims about renewable bio-fuel

BioPlant's consent application claims their technology will produce 'green renewable energy', 'biochar' and 'bio-diesel' or 'green diesel'. However, because the facility will process non-renewable materials like plastics - not just biomass - these terms are misleading and inaccurate. As discussed earlier the char produced by pyrolysis of MSW is totally different in nature to the bio-char produced from clean organic inputs. Given that it is created from mixed rubbish it is likely to contain toxic elements that make it unsuitable for use as a soil conditioner.

To be considered 'renewable' the fuel generated by the BioPlant process would have to be made from renewable feedstock. The two inputs that generate this fuel are:

- organic materials which are theoretically renewable and fossil fuel derived materials like plastics which are not. Over time the organic fraction of MSW will reduce due to the

introduction of emissions reductions targets so BioPlants claims to 'renewable' organic feedstocks will vanish.

- fossil fuel derived materials like plastics are not renewable and fuels generated by reprocessing them cannot be called 'renewable'. Burning these fuels generates CO2 emissions in exactly the same way that burning petrol or diesel does.

BioPlant claims that their facility will result in net savings of around 35,000t of CO2-e emissions per year due to offsetting landfill methane, electricity generation, and crude oil production emissions (see Table 2, p18; or document 7: Appendix 3 - Estimates of GHG Emissions for BPMNZ)

There are at least two major issues with these calculations:

1. The table assumes the entire quantity of MSW they are diverting from landfill would otherwise produce methane. However, only biomass/organic materials produce methane in landfill – plastics and other synthetic materials do not (the fossil carbon is effectively sequestered in landfill). Furthermore, Bonny Glen landfill, which receives MSW from Manawatū, has a methane gas capture system. While such systems are not 100% efficient, they do significantly reduce landfill methane emissions (estimated to be around 68% over their lifetime in NZ's Greenhouse Gas Inventory).

2. 'Scope 3' emissions are entirely excluded from their calculations. This would include, among other things, emissions from the 14,000 litres/day of synthetic diesel when burnt, the additional trucking of waste to and from the facility, and embodied emissions in products needed to build and maintain the facility (e.g. hydrogen, which is needed for hydrocracking to refine the diesel, is very energy intensive to produce).

Overall, these miscalculations raise questions as to whether the facility will save any GHG emissions at all, or whether it will in fact be a net producer of GHG emissions. This will depend on the ratio of biomass to synthetic materials in the feedstock, but BioPlant has not provided these figures. However, in document 4 in the list of documents supporting the resource consent, entitled 'BioPlant Manawatu NZ Resource Consent Application – Response to HRC Queries', in response to point 4 the company states that:

> *"As we are working closely with the other participants at the Manawatu Recovery Centre, we have agreed to share the waste streams with the other groups using digesters and composting technologies so that they have priority access to organic, green and putrescible wastes".*

This could further substantially reduce the biomass fraction in the pyrolysis feedstock, thus reducing the proportion of 'renewable' elements in their output.

By extension, the harnessing of energy from waste compromises wider efforts to decarbonise the nation's electricity supply. Burning non-renewable resources like plastics and other synthetic products is practically the same as burning fossil fuels (and potentially even worse if full lifecycle emissions are counted). Our electricity grid is already 85% plus renewable, creating electricity from non-renewable feedstocks takes us in the wrong direction.

The linear approach for dealing with hard-to-manage resources at the end of their useful life

BioPlant's pyrolysis proposal undermines rather than supports the shift to a low carbon, low waste circular economy.

Manawatū District Council's draft submission clearly states the Council's belief that the pyrolysis facility is compatible with a broader shift to a circular economy signalled by central government policy. The idea of *"the establishment of a pyrolysis plant to complement the wider waste management activities at the Resource Recovery Park in Feilding"* was supported by a majority of Councillors in a 17 March 2022 meeting.

We do not think this decision is consistent with MDC's WMMP or LTP statements. Supporting the BioPlant Waste-to-Energy pyrolysis proposal takes MDC in the wrong direction because pyrolysis is not a sustainable practice. This approach does not address the key issues flagged in the LTP solid waste section: resilience and climate change, growth and demand, affordability, and regulatory and compliance.

We agree that the new resource recovery centre creates an opportunity for the district to keep products and materials in circulation. It will play a key role in:

- catering for future needs
- underpinning a prosperous and resilient economy
- protecting the environment and human health and
- delivering innovation and excellence that leverages MDC's strategic location.

We totally disagree with MDC's conclusion that BioPlant's proposed waste-to-energy plant will

help deliver a circular economy for the following reasons.

Pyrolysis is a waste disposal technology

Pyrolysis of mixed solid waste is not compatible with the national, regional and local shift towards a low waste, low emissions circular economy. Pyrolysis is a waste disposal activity just like landfill. Focusing on disposal technologies keeps us stuck on the linear take-make-waste pathway. Investing in and supporting the development of waste disposal options soaks up the capex and opex budgets that could be used to put in place real solutions that reduce, reuse and recycle products and materials.

Supporting BioPlant's proposal to dispose of mixed solid waste means MDC is focusing at the bottom of the waste hierarchy. This is contrary to their Waste Minimisation and Management Plan and LTP which aim to use the priority order of the Waste Hierarchy as a basis for decision making and resource allocation. MDC will have a much better chance of solving their waste problems if they invest in solutions that use zero waste principles to prevent, reduce, reuse, compost, repair and closed-loop recycle.

Waste-to-Energy technologies do not address the continued production of waste - whether waste is disposed of in landfill or via waste-to-energy, they are both ambulances at the bottom of the cliff. In fact, Waste-to-Energy projects consistently derail efforts to reduce waste generation by locking-in the linear economic system of production, consumption and disposal of finite resources. Zero waste strategies require continuous effort and progress to reduce waste generation to as close to zero as possible, regardless of whether 'zero' is literally achieved.

The Manawatū region currently diverts about 32% of its waste. Local, regional and national drivers should see a rapid increase in diversion over the next ten years. These include: the Kawakawa Road Resource Recovery Park, the introduction by central government of a minimum binding diversion target of 50%, a comprehensive container return scheme for beverage containers, the requirement to remove food waste and other organic materials from the waste stream,[15] and a ban on the production of certain classes of hard-to-recycle plastics[16].

[15] See *Transforming recycling: Consultation document.* Wellington: Ministry for the Environment.
[16] See Plastic items and materials for phase out: detailed information Wellington: Ministry for the Environment

The government's waste strategy includes an aspirational goal for Councils of 70% waste diversion,[17] and as noted in our introduction, there are New Zealand communities that are already achieving rates higher than that. Given the above outlined initiatives and incoming regulation, coupled with community behaviour change projects, local waste quantities could fall further with corresponding positive social, environmental and economic outcomes. At a 70% diversion rate, the Manawatū region would only be sending about 3123 tonnes of waste to landfill a year, less than one truck a day.

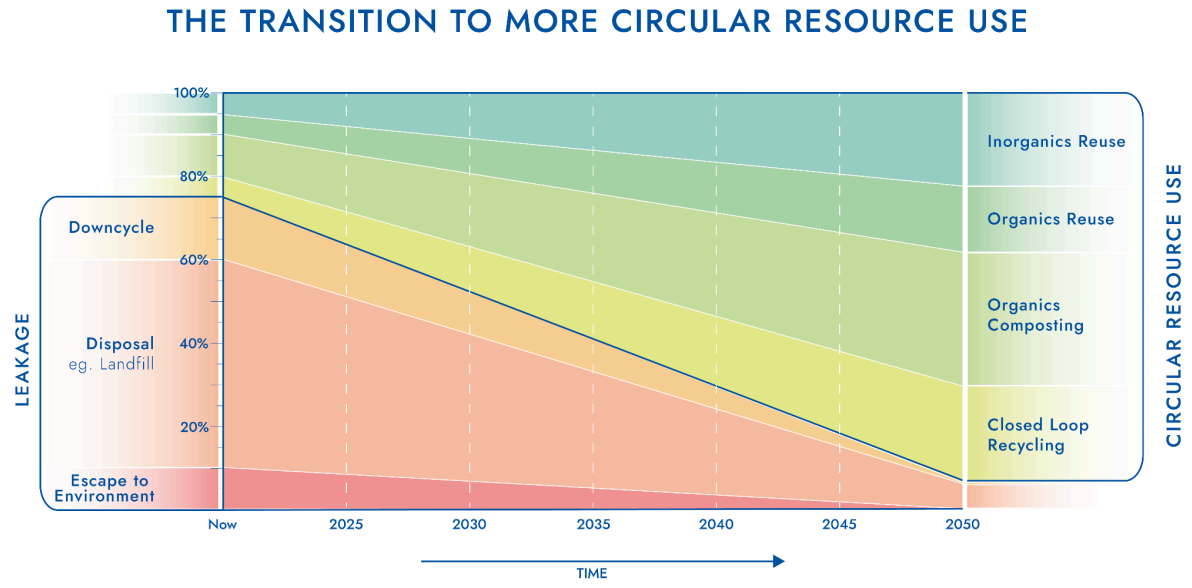
Misses the key circular economy drivers

Changing the way we think about production and consumption will increase resilience and reduce waste and emissions. The new circular economy lens focuses at the top of the waste hierarchy to;

1. Reduce the amount of raw materials coming into the economy in the first place.
2. Limit the amount of material leaking out of the economy as waste and emissions.

The goal is to minimise the amount of new raw material and fossil fuel drawn in, which minimises the ecosystem damage and biodiversity loss caused by extraction and pollution. The goal of a circular economy is to keep products and materials in circulation for longer so that we do not need to extract large quantities of raw materials to feed our economies.

[17] See Proposal 4: Setting targets/performance standards for councils in *Transforming recycling: Consultation document*. Wellington: Ministry for the Environment.



Zero Waste Network Stock Image 2021

This type of framework is useful when considering tricky issues like BioPlant's pyrolysis proposal. It is a Waste-to-Energy disposal technology so it is a form of 'leakage' like landfilling. It does not add value in a circular economy as it is just a shift in disposal mode rather than a move up the waste hierarchy towards more sustainable low waste, low emissions solutions.

Emissions reduction is a key driver

There are two main types of emissions generated from the 'waste' our economy creates as a side effect of production and consumption systems.

1. Emissions from landfill: mainly biogenic methane from organics stored in landfills
2. Consumption-based emissions: greenhouse gases generated across the product life cycle (mainly CO2 and N2O)

As discussed earlier in our submission, creating new forms of fuel from organic and fossil fuel derived mixed solid waste just turns one type of waste material into another. The process generates new forms of waste (char, filters, fly ash, wastewater etc.) that still need to be safely disposed of. The fuel itself generates CO2 emissions when burned. Creating these new forms of fossil fuel just perpetuates the current high emissions transport models.

Waste-to-Energy is part of the old extractive, linear economy story. As fossil fueled transport slips out of fashion, plastics manufacturing is becoming the next big thing. It comes accompanied by plastic waste and pollution that escapes into the environment. Waste-to- energy proposals follow as recycling options for many single-use plastic packages are limited. The trouble is that creating fuel out of plastics made from fossil fuels is just a different way of creating GHG emissions from the same raw materials.

BioPlant will need to import mixed waste

In 2020-2021, the Manawatū region sent 7,101 tonnes of rubbish to landfill, about 19 tonnes/per day. The BioPlant application would allow for up to 70 tonnes of wet waste per day to be processed. This means BioPlant could import up to 51 tonnes of additional wet waste into the community per day. This would turn one of New Zealand's "most beautiful towns" into a net importer of waste.

Changes in the operating environment mean that the local feedstock available for the BioPlant facility will be greatly reduced and the composition of the feedstock will change radically over time. It is important that the risks associated with changing feedstock and economic viability and ongoing operational costs are well understood as part of the consenting process.

Landfilling of waste is not a solution to the waste problem, and it raises its own set of issues. However, one of the major benefits of landfilling is that when waste to landfill is reduced, there is no corresponding loss in the functionality of the landfill. In fact, reducing waste extends the life of the landfill and lessens the impacts of it on the surrounding environment. It can be seen as a transition step to a truly zero waste circular economy.

By contrast, a pyrolysis facility will always require the same level of inputs in order to function properly. The failure to provide adequate and appropriate feedstock not only impacts on the ability of the plant to run at all, it can also dramatically impact on the concentrations of stack emissions. This is aside from the residual waste from the pyrolysis plant that must still go to landfill in any case.

Conclusion

We appreciate the opportunity to submit on this proposal. We look forward to the public hearings on this in due course. Please feel free to contact us should you have any questions regarding our submission in the interim.