SUBMISSION

SUBMISSION ON

Phasing out fossil fuels in process heat

31 May 2021

To: Ministry for the Environment
Name of Submitter: Horticulture New Zealand, Tomatoes New Zealand, Vegetables New Zealand and New Zealand Plant Producers Incorporated

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OVERVIEW

Submission structure

1. Part 1: Introduction and overall comments
2. Part 2: Response to consultation questions
3. Appendix 1: Grower Feedback and Case Studies

Our submission

This is a joint submission by Horticulture New Zealand (HortNZ), Tomatoes New Zealand (TNZ), Vegetables New Zealand (VNZ) and New Zealand Plant Producers Incorporated (NZPPI).

We thank the Ministry for the Environment (MfE) for the opportunity to submit on the proposal to introduce a national direction under the Resource Management Act on industrial greenhouse gas submissions (to phase out fossil fuels in process heat). We welcome any opportunity to discuss this submission further, and to provide further comment later – including input into a draft NPS and NES.

PART 1

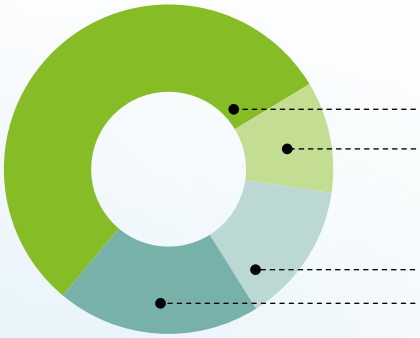
Introduction

Background to HortNZ

HortNZ represents the interests of 6000 commercial fruit and vegetable growers in New Zealand, who grow around 100 different crop types and employ over 60,000 workers.

There is approximately 120,000 hectares of horticultural land in New Zealand - approximately 80,000 ha of this is fruit and vegetables. The remaining 40,000 ha is primarily made up of wine grapes and hops, which HortNZ does not represent.

HortNZ's purpose is to create an enduring environment where growers prosper. This is done through enabling, promoting and advocating for growers in New Zealand.



Industry value $6.39bn
Total exports $4.23bn
Total domestic $2.16bn

Tomatoes New Zealand and Vegetables New Zealand

TomatoesNZ (TNZ)represents the interests of all commercial fresh tomato growers[1] throughout New Zealand. There are about 130 growers who produce standard and specialty fresh tomatoes that have a farm gate value of $131 million per annum.

Vegetables New Zealand (VNZ) represents the interests of 700 commercial vegetable growers in New Zealand, who grow around >50 different crop types and employ over 10,000 workers. This includes a unique set of growers who grow covered crops.

NZ Plant Producers Inc.

NZ Plant Producers Inc. (NZPPI) represents the commercial nursery industry and related businesses. It is a voluntary membership organisation with 306 member businesses. Plant producers and retailers employ more than 5000 people across New Zealand and contribute $1b to our economy.

Executive Summary

The key messages of this submission are:

- The industry acknowledges the need to transition to non-fossil fuels, and is taking steps on this journey, however there are no simple options for transition. Alternative fuels are not always available (depending on location, feasibility etc.) or affordable. In many cases the technology is emerging and/or is unproven in a New Zealand context.
- It is critical that timeframes for transition enable the change to occur at a pace that does not put growers out of business before the alternatives are in place, and that there is support provided from Government for that transition. This is particularly important, because these businesses provide vegetables for domestic food supply, that will be lost from our food system if they go out of business.
- We generally support the approach of targeting coal with a phase-out date of 2037 (subject to thresholds that enable use for peak loads/back up), however it is important to build- in review conditions – as there remains uncertainty regarding alternatives. We strongly support the need to take a more flexible approach for other fossil fuels and urge MfE to consider how the proposal can carefully balance costs/benefits when implementing these proposals. A degree of flexibility/review is also warranted in the current dynamic policy environment.
- As highlighted in this and other recent submissions on this topic, we seek that Government provides support to enable transition away from fossil fuels, rather than solely relying on private sector R&D investment or regulatory instruments.
- Tomatoes New Zealand and Vegetables New Zealand are in the early stages of a decarbonisation plan in partnership with EECA – this will provide better information on the pathway forward than what is known currently.

Submission

1. Background

There are approximately 256 hectares of covered/indoor crops in New Zealand (based on 2017 Agricultural Production Statistics data). Crops are grown close to markets throughout New Zealand.

Greenhouses are a highly efficient food production system, optimising the use of land, water, and nutrients. Greenhouse growing uses techniques not used in other cropping systems such as CO2 enrichment, soilless cultivation and heating.

Covered crops are a relatively small user of process heat at a national level compared with other sectors. EECA's energy end use data base indicates that amongst low and intermediate temp heat users (using boiler systems for heat/cooling) for 2019, indoor cropping accounted for 9.7% of coal use and 4.3% of natural gas use. Without heating, New Zealand growers could not supply their produce year-round to New Zealand consumers.

Greenhouse vegetables are grown year-round in a relatively stable, controlled environment with optimal growing conditions that offer the ability to produce a lot of vegetables in a sustainable way to feed our growing population. Most vegetables grown in greenhouses in New Zealand are for domestic consumption; the main greenhouse-grown export crop is capsicums. Other greenhouse crops include cucumber, lettuce, and herbs. Domestic Food Supply is a key value that needs to be considered (and maintained) in managing transition to lower emissions fuels.

NZ Plant Producers propagate and supply all of the seedlings which go into the covered cropping industries. Process heat is used to germinate seedlings and/or strike the cuttings which underpin New Zealand's horticultural industries, amenity and landscape plants, including indoor and container grown plants.

A 2018 report by NZIER evaluating the contribution of the covered (greenhouse) vegetable crop industries to New Zealand found that the sector provides approximately 2400 jobs.

HortNZ/VNZ/TNZ has submitted on a number of consultations on this topic, including a recent submission on the Climate Change Commission's draft advice to Government[2] which provides detail on the covered crop sector, and the opportunities and challenges of transition. The key theme of these submissions is that the covered crop industry does need to transition to renewable energy sources and that, over time, this will be possible. Sufficient time for the technology and alternatives to become available and economically viable is required to support ongoing food production in the interim. There remains barriers, risks and costs which make transition challenging.

[2] Available here: https://www.hortnz.co.nz/assets/Environment/National-Env-Policy/Climate-Change/HortNZ-CCC-Advice-Submission-March-2021.pdf

PART 2

2. Response to consultation questions

PROBLEM DEFINITION, OBJECTIVES, SCOPE

Q. 2	How would you describe the status quo? What other factors should be considered?

Fossil fuels in the covered crop sector are largely used for heating, and also C02 enrichment.

- **Heating has multiple functions that provide efficiency and quality (and therefore viability).** As well as determining the rate of photosynthesis, fruit set and fruit ripening, temperature regulates plant growth rate by driving transpiration rates and photosynthesis rates. Heating also allows the grower to manage relative humidity in the greenhouse, reducing the onset and spread of diseases, reducing the use of agrichemicals and increasing the fruit quality. Many growers rely on growing year-round for the viability of their business. Without being able to do so they would not be able to pay off the capital investment needed for greenhouse growing (with a new operation building cost starting at $2M per hectare).
- **It is not possible to grow these crops in winter without heating**, and not growing year-round would affect the viability of greenhouse businesses, as a considerable portion of revenue is generated in the winter months, plus it allows for staff to be employed year-round. Winter growing provides for a variety of vegetables throughout the year. An Otago University study showed that when prices increase (as would be the case in New Zealand if crops grown indoor were replaced by imported and preserved products), consumption of vegetables is predicted to drop, with negative health consequences. [3]
- **Heating is used in seedling production** – for seed germination, cutting production and growth. It is essential for maintaining even growing conditions and plant quality.
- **CO2 enrichment** - enhances crop growth, by increasing photosynthesis. rates. Too little CO2 results in slowed plant growth and reduced yields. CO2 enrichment is used as a supplement on bright days as in the enclosed environment the plants consume the CO2 rapidly, CO2 drops causing photosynthesis rates to drop. CO2 is captured from the gas heating process and directed into the greenhouse. Some growers buy in tanks of supplementary CO2, especially those using non-gas heating sources.

A recent industry survey conducted by Tomatoes New Zealand and Vegetables NZ of their members indicated that the most common form of greenhouse heating is natural gas (62% of the heated area of survey respondents), followed by coal (15%). The survey also highlighted regional differences in fuel source:

- Natural gas was limited to the mid and upper North Island (there is no reticulated gas network in the South Island).
- There was one large grower in Central North Island using geothermal energy.

[3] Cleghorn, Cristina. 2020. The health and health system costs of increasing vegetable prices over time. Wellington: University of Otago, 2020.

- Diesel/oil heating was found in all regions but is slightly more common in the South Island.
- Biomass was only being used in the South Island, but is the most commonly-considered alternative fuel.
- Only one small grower was using electricity to heat their greenhouse.

In the plant nursery sector, Zealandia Horticulture use biomass for heating at their Christchurch nursery. Across the rest of the sector the profile is likely similar to above (i.e use of natural gas where there is access to it in the North Island and predominately coal in the South).

Consents

At present, some greenhouse operations will already hold consents (for discharges to air), and others may be operating as a permitted activity. The requirement for consent varies across the country and, in some cases, by Air shed. These rules and/or consents are managing effects from an air quality perspective.

For example:

- the Canterbury Air Regional Plan includes a permitted activity rule (7.20) for discharges to air from large scale fuel burning devices up to certain thresholds - i.e., for gas, net energy output less than or equal to 5MW, for other fuels thresholds depend on whether located within Clean Air Zone or not.
- the Bay of Plenty Regional Air Plan (PC 13 operative provisions) distinguish between solid fuel burners located in or out of the Rotorua Airshed, a spectrum of activity status' ranging from permitted to non-complying.

Fuel markets/ alternatives

Another factor that needs to be considered is the fuel/energy supply markets, in regard to alternative fuels and/or technologies which will be required to enable transition.

Switching fuel use from coal and natural gas to biomass and electricity requires further investigation and research on alternative fuel supply and technology availability by region and capacity before time steps can be agreed. Otherwise, we risk carbon leakage by import substitution, for example 90% of New Zealand's tomatoes are grown for supply to the local domestic market and 100% of cucumbers. Protecting New Zealand's food security is vital.

All fuels are of equal uncertainty currently and it is too early to make effective decisions on their use for our industry. As mentioned throughout this submission, TNZ and VNZ have recently embarked on a decarbonisation plan in partnership with EECA, which we hope will make this clearer.

We note the following statement in the Climate Change Commission's draft advice and agree that there will be significant added cost: "*There may be constraints on biomass supply in some regions where there is not significant forestry*". Other sources of biomass may be available, such as crop and agricultural biomass. Where biomass is not readily available, "*electric boilers will be needed, but at a significantly higher operational cost. Electrification of process heat will also require expansion of the electricity transmission and distribution grids. This will add to the total cost.".*

Electrification requires the building of more power stations to address supply constraints, and both electricity and hydrogen will require growers to write-off their investment in their

current boilers. Biofuels could be used with modifications to existing boilers so these capital assets are better utilized. If electricity is used, then a back-up system is needed as growers cannot rely on electricity alone during times of peak loads (so a hybrid system will be needed). In addition, both energy sources require adequate storage, and this is an area where we see that government investment is needed.

Biomass is an option of strong interest for growers. All wood fuel is not the same and location makes a difference (e.g., South Island vs Northland) due to the proximity and availability of fuel.

Consideration also needs to be given to growers' asset value - this is their wealth – when considering how best to transition.

The Climate Change Commission 2021 Draft Advice path assumed significant improvements in energy efficiency across the food processing sector, as seen in Figure 3.15 below. Growers are already doing, or planning, a range of energy efficiency options and making real energy savings. Examples of these are provided in the attached **Appendix.**

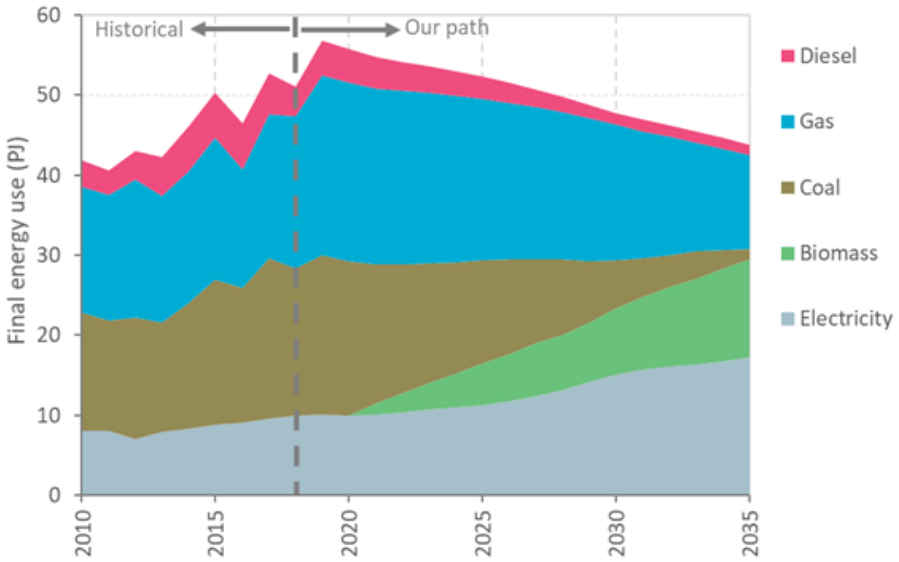


Figure 3.15: Food processing energy use in our path. Source: Commission analysis.

TNZ/VNZ along with EECA commissioned a technology scan for the covered crop sector – this should be finalised shortly and we would be happy to provide this once available.

Q. 3	Do you agree with the characterisation of the problem regarding the regulatory gap in the RMA? If not, why not?

Agree that the absence of national direction on this topic could lead to inconsistent approaches around the country once the RMA changes enabling consideration of GHG's come into force.

Notwithstanding, we note that it is also important to recognise the yet-to-be released final advice from the Climate Change Commission which is due 31 May to Government – ideally this consultation would follow from that, but we appreciate the time constraints involved with the 31 December 2021 date. This is an important consideration to ensure the NPS/NES remains relevant and fit-for-purpose.

Q. 4	Do you agree with the characterisation of the problem regarding the regulatory backstops to support the NZ ETS? If not, why not?

Agree that this national direction should act as a' regulatory backstop', complementary to/aligned with other mechanisms, not the lead piece of legislation/policy driving change. The RMA could assist transition by enabling changes away from fossil fuels and avoiding creating barriers to climate change adaptation and/or mitigation.

To ensure that this remains the case (i.e., that it is a regulatory backstop) there will be a need to consider the final advice from the Climate Change Commission, and ongoing work that needs to occur in this space to enable transition.

As a more general point, it is important that the proposed RMA mechanisms support and enable transition (at a pace which is achievable in the wider context of the value of the industry to New Zealanders health, and given the alternative fuels/technologies available – a lot of which remain unproven). It would be a significant consequence if the pace of change required through the proposed NES/NPS framework led to fruit and vegetable producers (and the nurseries which supply them) unnecessarily being driven out of out of business.

Q. 5	In your view, what is an effective and efficient threshold for low-GHG emitting process heat sites that would be out of scope of the requirements? Options and combinations of options include: below 100 tonne CO2-e/year, 50kW, 2 MW, assets operating fewer than 400 hours per year. Please explain why.

We support a threshold that provides an allowance for use of fossil fuels where they may be required for peak times such as back up supply to deal with peaks in energy demand (when cold in winter).

Due to the limitations of some alternative technologies, the ability to use fossil fuels on a limited basis for support at peak times and/or back up is really important for the industry. We support a threshold which enables these small-scale activities to be out of scope of the proposed NES/NPS framework.

The threshold for back up supply needs to be adequate to provide for security of energy supply. The size requirement for this is not clear currently and requires further research and analysis, including recognition of regional variability. It may be that a 2MW boiler will be sufficient but analysis work has not been done on this yet. We will likely have a better sense of what an appropriate threshold will be following completion of work involved in our sector decarbonisation plan and would welcome any opportunity to feed this in at a later date.

PREFERRED RMA NATIONAL DIRECTION INSTRUMENT

Q. 9	Do you agree that the preferred option (a NES supported by a targeted NPS) will be the most effective way to achieve the policy objectives and to

	reduce implementation costs and uncertainty for local authorities, applicants and consent holders? If not, why not?

Yes, support the preferred mechanism of an NES to provide a set of rules, alongside a targeted NPS to provide the policy framework. Agree with the analysis that this will reduce resourcing demands of otherwise each Council setting their own rules and will lead to a cohesive approach nationally.

(Subject to the need to recognise that different regional contexts – e.g., availability of non-fossil fuel heat source alternatives – does need to be acknowledged and provided for within the framework).

Q. 10	Do you agree with the impact analysis of this option?

Generally, agree. Would also note that, while we agree that in terms of the effects of GHG discharge are not regionally localised – in terms of technology and alternative options, these do have a regional aspect (for example, in some regions biomass is a more viable alternative than others).

Q. 11	In your view, what is a fair and reasonable duration for consents that would be balance the need for investment certainty with the need to improve energy efficiency and reduce emissions over time?

We agree that consent durations that are too short can reduce investment certainty and deter investment. Conversely durations that 'lock in' GHG emissions for a long duration would be contrary to achieving New Zealand's 2050 targets.

A fair and reasonable consent duration would depend to some degree on the fuel, specific context (in terms of transition options) and the strategic plans of the business (i.e., whether the current use of fossil fuels is part of an overall transition strategy).

For existing coal, where there is a clear phase-out policy direction – consent duration should not exceed 2037 (unless there are exemptions which apply).

For other fossil fuels:

- Existing – would be influenced by the timeframes for transition demonstrated in a GHG emissions plan.
- New - a reasonable duration would be required for certainty. Where a new fossil fuel asset is granted consent, due to the robust framework under which it would be assessed, it would be justified to provide a reasonable consent duration (for example 10 or 15 years), unless there is a specific reason not to. It may also depend on whether the new fossil fuel asset is part of a transition towards renewables over time (in which case the duration should provide for this).

We consider it necessary to be mindful of upcoming and future emissions budgets (which do not anticipate a zero GHG emissions situation) and advice which comes out for specific sectors/activities which are targeted.

It may be that the best approach is to have some level of discretion in terms of consent duration, with policy guidance on what could be an acceptable range. For example, policy

(in NPS) which supports longer durations when there is a clear plan for transition and/or a longer duration enables transition.

Where possible, it is preferred that an adaptive approach (based on for example, a GHG emissions plan) that enables improvement/minimisation over time is taken rather than relying on short consent durations which would likely be a costly and inefficient approach for businesses.

An unreasonably short duration will only result in additional compliance costs for business – and be administratively costly for government, without necessarily delivering benefits that warrant such an approach.

A preference instead of setting strict phase out dates would be a review process which enables businesses to operate whilst alternative fuels options continue to develop towards feasibility. We are seeking flexibility to account for the cost of fuel switching and allow for feasible alternatives to evolve. The adoption of best practice over time will assist with this transition.

We note that a risk of staggered consent durations which effectively amount to a phase out date on a consent specific basis, may create an 'unequal playing field' for industry participants (i.e. those with early consent expiry dates have higher economic feasibility barriers as they must compete with other industry participants who have potentially an extra 10-15 years of time). Therefore it would be preferable to take a 'whole of industry approach' - however it is not yet clear what this date should be in order to represent what is 'economically and technically' feasible (and the viability of the industry of a whole is important for a number of reasons, including food security).

PREVENTING DISCHARGE OF GHG EMISSIONS FROM NEW FOSSIL FUEL ASSETS

Q. 12	Should the ban on new coal-fired assets for low and medium temperature requirements be implemented through a prohibited activity rule in national direction? Should there be any exemptions for small-scale coal-fired assets (for example, below 50kw, 2 MW or 100 tonne/year) or flexibility to consider site specific constraints through consenting processes?

A prohibited activity status is very definitive and, we consider should be used with caution, however it does also provide a high degree of certainty. In this case (i.e., for coal specifically), we accept a prohibited activity rule with appropriate exemptions. This should also be considered in the context of question 5 (regarding the effective and efficient threshold for low-GHG emitting process heat sites that would be out of scope of the requirements).

As discussed in response to Q5 – we consider that it is important (as part of enabling use of non-fossil fuels) to provide for continued limited use of fuels such as coal in a peak/back-up support capacity. Similarly, we consider it would be appropriate to consider an exemption for small-scale assets where there are no feasible alternatives.

We note that a threshold based on boiler size could penalise growers who have oversized boilers (i.e., surplus to their capacity; they may be using set points to get better efficiency which needs to be recognised) – therefore it may be preferable to base a threshold on actual energy output, as opposed to the energy output capability of the boiler. We note that it is not uncommon for growers to have oversized boilers.

Q. 13	Do you agree with the approach to avoid new fossil fuel assets (excluding coal) unless it can be demonstrated there are no feasible alternatives, and where the applicant prepares a GHG emission plan, and complies with relevant best practices? Are there more effective and efficient ways to achieve this outcome?

Support an 'avoid, unless …' approach over just avoid (which has strong meaning, as demonstrated in case law), and is more appropriate because it provides strong direction on the limits of discretion. We support the use of a Restricted Discretionary Activity status. It is important that there is a degree of flexibility to 'avoiding' new fossil fuel assets (excluding coal) – because at this time, natural gas for example remains the most suitable option for many greenhouse growers (refer to Appendix A for examples). Until such time there is certainty of suitable alternatives, it would be unwise to take a hard 'avoid' approach, however we see merit in providing a policy signal to avoid where possible.

It is also worth noting that some fossil fuel assets (for example assets which are set up to use natural gas) may be able to be transitioned over time to lower emissions and/or renewable fuels – such as for example, biogas or hydrogen gas. This is being explored by First Gas and others currently.

The approach needs to be scalable (to recognise different business sizes, resources and capabilities), have reasonable expectations with regard to the need to demonstrate 'no feasible alternatives and industry appropriate best practice – these aspects are touched on in further questions below.

Q. 14	How can national direction and guidance best assist applicants and consent authorities to assess economically and technically feasible alternative fuel options?

Need an approach which makes use of existing data (and information released over time) by Government, sector groups and industry, rather than relying on every individual business to 're-invent the wheel'.

It is important that the information and assessment expectations on consent holders are reasonable and do not impose undue costs – an effective and efficient way to assist in achieving this would be to leverage industry information.

The vegetable and tomato greenhouse industry has partnered with EECA to develop a sector decarbonisation programme. This is in the early stages of development of a two-year plan as a pilot project. The goal is provide our industry with information and options that are economically feasible based on the growers' size, age, capabilities and financial situation. This includes benchmarking and research to identify and evaluate opportunities, followed by technology demonstrations, case studies, benchmarking, best practice guidance and decision tools.

The approach taken by MfE should acknowledge that what is economically and technically feasible will change over time – as should be viewed as a transition pathway that occurs at an appropriate timescale.

Q. 15	Should the policy approach for new process heat assets target specific fossil-fuel sources or should it take a fuel neutral approach? In your view, what is the best approach to define thresholds and requirements?

Support the proposed approach of taking fuel specific approach, compared to a completely fuel neutral (i.e., providing a different approach for coal).

Target coal as priority where economically feasible to switch. (We also understand it to be the most carbon intensive fossil fuel)

Other options away from gas require more time to determine if they will be feasible/available for greenhouse heating. Gas also has other benefits – such as CO2 enrichment. We agree with the following statement in pg 37 of the consultation document:

"For some manufacturers who use natural gas, no economic alternatives exist in New Zealand. Switching away from natural gas generally starts to become economic only when the emissions price exceeds $120/t CO2-e. Depending on the timeframe (and the emissions price over time), a phase out of gas is likely to impose high costs on some industries and could force much higher abatement costs compared to more cost-effective options in industry and the wider economy. Therefore, it is likely that a longer lead in time for a phase out of natural gas is appropriate for the development of technical alternatives."

The approach to defining thresholds and requirements should understand the cost of implementation compared to the gain (in terms of emissions reductions), so that the cost benefit analysis is favourable and the approach is efficient as possible and without unnecessary cost. It should also provide for the ability to use fossil fuels on a limited basis for support at peak times and/or back up, as previously discussed in response to Q5.

Q. 16	Referring to each option, what are the likely compliance costs and impacts on your firm? Who are the small to medium size industry users that could struggle to meet the requirements?

Option 1.1: *Prohibiting the discharge of GHG emissions from new coal-fired assets for low and medium temperature process heat requirements through a prohibited activity rule in a NES.*	Cost associated with transition to a non-coal (and ideally non fossil fuel) based alternative can be substantial.
Option 1.2: *Policy and rule to avoid discharge of GHG emissions from new fossil fuel assets (excluding coal) for low and medium temperature process heat requirements unless there are no feasible alternatives.*	Costs associated with meeting information requirements for resource consent, and the cost of the resource consent process itself – this would vary depending on the size of the business and a number of other factors, so it difficult to quantify at an industry-wide level. (We note that the costs of this option could be lessened by providing an efficient process, that has clear information requirement expectations tailored to scale, and an approach which utilises

	Government and/or industry information available on alternatives).
Option 1.3: *Prohibited activity rule for discharge of GHG emissions from all new fossil fuel assets for low and medium temperature process heat requirements with specified exemptions.*	We do not support this option. This would have significant costs for the covered crops industry in New Zealand, and would likely push a number of these out of business – which would have negative impacts on food supply (among other things – including the possibility of carbon leakage from imported produce). This is contrary to the policy intent, that RMA national direction provide a regulatory backstop.
Option 1.4: *Avoiding discharges of GHG emissions new fossil fuel assets above a emission volume threshold for particular sites.*	Potential to have similar impact as Option 1.2 depending on the level at which the threshold is set, or conversely could be relatively cost-neutral if below the threshold (but may need input to determine whether or not the business is within the emission threshold). Does not take into account feasibility of alternatives, which is a very important consideration.

All growers could struggle to meet these requirements depending on their level of debt and staffing. Many small to medium size growers consist of family businesses who do not have spare capacity for meeting additional compliance requirements.

From a consenting perspective alone (i.e., disregarding the capital costs of transition) - we note that the proposal is likely to result in a substantial increase in compliance costs for those who are currently operative under permitted activity rules. For those with existing consents – the focus of these is largely air quality, will also mean a potentially substantial increase in compliance costs from the need to do additional assessment/management plans etc. for emissions.

Q. 17	What supporting initiatives are needed to transition away from fossil fuels in new industrial sites?

As explained in HortNZ's submission to the Climate Change Commission (and other recent submissions), transition requires government to work alongside industry to assist in overcoming the financial and non-financial barriers to transition.

Factors which would support the transition away from fossil fuels include:

- Financial support
- Access to technical support
- Availability of viable alternatives and technologies
- Fuel supply certainty

Government funding needs to support growers to transition and reinvestment of funds through the ETS back into the sector would be welcomed by the industry.

Currently the Government Investment in Decarbonising Industry (GIDI) fund is limited to projects >$500k with co-investment <50% & <$5m. The funding rounds are considered too short for most growers to tap into and the majority of the industry are smaller growers that do not fit the GIDI fund requirements.

In addition, opening up more Energy Transition Accelerator (ETA) for growers who aren't considered "large energy-using businesses" would be helpful, with learnings shared by the industry.

We welcome consideration of a subsidy towards the cost to growers for retrofitting thermal screens on their greenhouses if the asset is under 15 years.

In addition, funding research to explore the ability to use heat pumps for retrieving heat from low-grade sources (industrial) in New Zealand greenhouses is needed, along with investigation of high-grade energy such as geothermal.

We need government to facilitate partnerships with future biomass suppliers and technology partners who can convert these raw inputs into new fuel sources. We need partners to develop supply chains which can provide the volume and reliable supply needed for the transition. It is risky to see this as an industry problem to solve – our members are growers, rather than fuel suppliers.

As an example of the challenges growers face in transitioning: "*At one site we explored changing from waste oil to a renewable resource. Electricity was significantly higher capex and opex, so was not feasible. Biomass had very slightly lower opex compared to waste oil, but still required $4.2m in capex to transition. Even with significant co-funding to change, this was still economically unfeasible to be competitive and change in today's tomato market.*"

PHASING OUT FOSSIL FUELS IN PROCESS HEAT

Q. 19	Is 2037 an appropriate 'phase-out' date for low and medium temperature coal process heat requirements? Is it necessary to include a review date within the national direction instrument (potentially around 2025) to assess the development of alternative fuel markets closer to the phase out date?

Generally, we agree with the 2037 date for coal – on the basis that there has been strong signalling that the Government seeks to phase out the use of coal. We see this date as being complementary with the policy intent to act as a regulatory backstop.

Yes– we think it is necessary (and important) to include a review date, because of the uncertainty in future energy supply markets, emergence of new technologies and that a prohibited activity is proposed (which is an inflexible policy approach). As noted in the report, "*the feasibility of coal users switching to lower emission fuels (for example, biomass and electricity) is reliant on these markets having sufficient capacity to meet demand.*" (pg.34).

As suggested in the consultation document, 2025, would seem to be a sensible timeframe for review.

We also consider that there should be policy direction which recognises/provides for domestic food supply (and the maintenance of this value) as a reason for providing a

different phase out date for a sector – should this be warranted on review. It is important that safeguards such as this are built in to protect against unintended consequences.

(Note: We support exemptions to the phase-out of existing coal by this date in some cases e.g., when coal is only used to manage peak demand etc. - i.e., it is enabling the use of renewable energy most of the time by assisting with overcoming constraints. This links to Q5 which relates to low-emitting process heat GHG which would be of out of scope of requirements).

Q. 20	Should there be a longer lead-in time for existing coal-fired assets that are currently permitted before these are subject to the NES consent requirements?

There is a need to distinguish/consider separately the lead-in time for transition (e.g., approx. 15 years to transition out of coal, by 2037) and the lead-in time for requiring consent under the proposed new NES.

In terms of consented coal-fired assets – we understand a discharge consent (to air) granted before the NES is gazetted prevails over the new NES until there is a review of consent conditions. This provides a transition period.

For currently permitted coal-fired assets – as per existing use rights provisions of the RMA, businesses will have six months post-gazettal to lodge a consent application. We seek that the NES build in a longer phase in period for these situations, to enable businesses to plan and to seek the necessary technical advice (as well as managing the potential consenting influx for councils) – we suggest that the rules for existing coal-fired assets do not apply for a three-year period after gazettal.

Also – we seek an allowance for businesses who intend to transition out of coal within the next few years to not be required to seek a consent in the meantime, as this could be inefficient and not result in any additional benefit in terms of emissions reduction. We propose a five-year period from gazetting – *e.g., if a business will no longer be using an existing coal-fire asset by [date five years from gazettal] consent requirements of the NES do not apply.*

Q. 21	Is it appropriate to phase out other (non-coal) fossil fuels in existing industrial assets through consenting processes and best practice requirements?

Consenting processes should not be the only driver of phase-out (consistent with the intent that this RMA response be a regulatory backstop).

It is critical that phase-out requirement occur at a pace which enables transition in a way that is sustainable in a business viability sense – to avoid perverse outcomes. As noted elsewhere, some fuels (e.g., gas) have benefits beyond heating such as CO2 enrichment which also need to be considered in terms of viable alternatives.

Most growers using coal are unlikely or unable to switch from coal to gas, because gas is not available in the South Island.

The industry is concerned about the risk of unequal phase out, which could result from using a tool such as consenting for this purpose. Different consent requirements and

durations could result in an unequal playing field between industry participants. It would be better to take a 'whole of industry' approach. Taking a 'whole of industry' approach to phase out makes the barrier of being economically feasible lower – as the economic barriers for all participants move at once.

Taking a whole of industry approach is appropriate because of the importance of growing for domestic food supply, and the importance of supply vegetables close of market throughout New Zealand.

Q. 22	Is a more flexible approach for the re-consenting of other (non-coal) fossil fuel-fired assets warranted/needed?

Yes, because:

- There is less certainty over the technology/options for transition on this scale and the resulting realistic timeline for transition.
- Fuels such as natural gas have co-benefits, including for the use of CO2 in glasshouses. It also is a 'cleaner' burning fuel than coal.

There remains a lot of uncertainties in regard to transition options – for example, we believe there is work to be done at a Government level in terms of assessing if/how the availability of biomass is sufficient to meet the demand (across various sectors and locations).

Q. 23	Should there be a set phase-out date for other (non-coal) fossil fuels, including natural gas? What are the potential benefits and risks?

No, not at this time - because we do not yet have enough data or information on alternatives and on pathways to transition.

We need government to facilitate partnerships with future biomass suppliers and technology partners who can convert these raw inputs into new fuel sources. We need partners to develop supply chains which can provide the volume and reliable supply needed for the transition. It is risky to see this as an industry problem to solve – our members are growers, rather than fuel suppliers.

Risks include business going out of business, which would have consequences on regional economic outcomes, employment and for covered crops which are producing fruit and vegetables the resilience and diversity of domestic food supply.

Other consequences (of a transition that is too fast) includes stranded assets, loss of jobs etc. Please refer to our appendix for grower feedback on this.

Q. 24	Should the NES require regional councils to review consent conditions of significant GHG emitters with long-term permits to help reduce emissions? What are the benefits and risks?

We see some merits in reviewing consents with a long duration for significant submitters, for example, it will ensure that businesses with shorter durations are not disproportionally subject to regulation, while others are not subject to any additional requirements. A risk is

that it may be a resource intensive exercise, when in reality there are other signals (e.g., the ETS) which will also likely drive change and reduced emissions over time.

Any consent review should also ensure that one grower does not gain a competitive advantage over another (commercial inequalities) – for example, if a large grower's consent is due in 2022, but their similarly size competitor's consent is not due until 2030, then the grower whose consent expires earlier may be unfairly disadvantaged.

Q. 25	What are the appropriate size (operating capacity and/or volume of emissions) and/or consent duration thresholds to trigger a review of existing discharge permits? What is a realistic and achievable timeframe for regional councils to undertake a review of the discharge permits for large emitters in their region?

Support consent review being applicable to significant emitters only, for reasons expressed above.

Further research is needed in order to be able to respond adequately to these questions for our industry.

The purpose/outcome sought through consent reviews must be clear (e.g., getting a GHG emissions plan in place for example) – noting that a review of consent conditions cannot be used to materially alter the consent's nature and must have regard to whether the activity will continue to be viable, so it is quite distinct from a consent renewal.

Would be inefficient to review is the consent is due to expire in the near term – should only be for consents with existing long durations.

Q. 26	Referring to each option, what are the likely compliance costs and impacts on your firm? Who are the small-to-medium size industry users that could struggle to meet the requirements?

Option 2.1: *Phase out coal in existing sites by 2037 for low and medium temperature process heat requirements through re-consenting processes*	Costs associated with meeting information requirements for resource consent in the interim, and the cost of the resource consent process itself – this would vary depending on the size of the business and a number of other factors, so it difficult to quantify at an industry-wide level. The capital cost of transition – which would depend on the transition options available.
Option 2.2*: Phase out other fossil fuels in existing sites through re-consenting processes and best practice requirements in a NES*	Costs associated with meeting information requirements for resource consent in the interim, and the cost of the resource consent process itself – this would vary depending on the size of the business and a number of other factors, so it difficult to quantify at an industry-wide level.

	The capital cost of transition – which would depend on the transition options available.
Option 2.3: *Require regional councils to review consent conditions for significant GHG emitters with long-term permits*	For the covered crop industry – the costs of this option are dependent on the level set for what is a 'significant GHG emitters'.

Many of our growers are small family-owned businesses; mum and dad and a couple of employees. It would be extremely difficult for them to undertake the compliance requirements. For example, it's a struggle to get all growers to apply for "free units" because of the time, effort and knowledge required. This is even harder for growers who have English as their second language.

Q. 27	Is there anything that has been overlooked in this section with regards to the reality of business practices? For local government: is there anything that you feel has been overlooked in this section with regards to the reality of consenting practices?

There needs to be a clear definition of process heat – what is in/out of the requirements.

The industry is putting a lot of work into finding solutions which support transition, but this takes time.

GHG EMISSIONS AND BEST PRACTICE REQUIREMENTS

Q. 28	Do you agree with the proposed thresholds for small sites being between 100 and 2,000 tonne CO2-e/year and large sites, being over 2,000 tonne CO2-e/year, in the preparation of a GHG emissions plan?

It is important that the requirements in the NES/NPS framework are scalable, as there is diversity within the industry in terms of size and scale of operation. We support there being a distinction between small and large sites – in practice, the approach needs to be scalable within these categories as well.

We feel the best approach for growers to prepare and implement a successful plan for transition and energy efficiency improvements is by taking a straightforward grower-led approach which allows the time needed to achieve best results for the site. This includes provision of adequate transition periods to allow for the capital cycle of the grower's assets (boiler, storage and delivery infrastructure) through milestones and monitoring.

Requirements will be different based on the size of the grower's site, crop energy requirements, age of the site and infrastructure (if new or extending, or existing), and region. Design of the management plan requirements how "economically and technically feasible" is defined.

Thresholds (as discussed in response to Q12) should be calculated based on actual output, rather than the maximum boiler capacity - we note that a few of our largest greenhouse growers may be categorized as "large emitters" based on their boiler maximum output (which may be higher than the average output for operations).

Q. 29	Do you agree with the proposed requirement that GHG emissions plans for large sites be reviewed/certified by a 'suitably qualified expert'? Should this be limited to larger sites?

Growers already have Good Agricultural Practice (GAP) farm plans – through either GLOBALG.A.P or NZ GAP. GAP Plan are a type of integrated farm planning, with food safety, environmental and social practice standards.

The GAP plans adhere to internationally accepted concepts of assurance. The GAP farm planning standards are approved, and then each farm is independently audited to determine whether the farm meets the standard. Growers who met the standard are certified by a recognised certification body. For example, NZGAP is the certification body that certifies growers as meeting the NZGAP standard on the recommendation of independent audit.

Under the GAP scheme the GHG mitigation and growing expertise is used in the development of standards. Audit expertise is also used to check that the standard is being implemented. Growers may draw on the experience of farm advisors to assist in deciding what mitigations to implement. However, these are trusted advisors, not certifiers.

We are strongly opposed to individual expert certification of plans, as we consider it undermines the value of independent assurance against accepted standards. Individual certification puts too much discretion in the hands of individual experts to depart from accepted standards. We support, audit and certification by accredited bodies against accepted standards.

Global GAP standards include consideration of greenhouses gas emissions. NZGAP plans, do not currently include consideration of greenhouse gases, other than nitrous oxide, but the NZGAP greenhouse gas standards are being reviewed and updated as part of He Waka Eke Noa.

We support a threshold for which scale of sites is required to demonstrate they have an independently audited GHG emissions farm plan, certified as part of a GAP scheme.

Q. 30	What guidance and templates would be useful to help industry and councils prepare and review GHG management plans?

The GAP farm plan standards are underpinned by research and codes of practice. For example, the NZGAP EMS includes standards and templates. Growers seek advice from expert farm advisors, but growers are encouraged to take ownership in the development and implementation of their plan.

A plan and best practice guidance for the greenhouse horticulture industry co-developed with government (via EECA) is a practical approach and industry organisations (such as HortNZ, TomatoesNZ and Vegetables NZ, and NZ Plant Producers Inc.) can lead uptake and use by growers.

Best practice guidance should include options based on what is still emitted if it is not considered feasible to transition away from gas use for some time, acknowledging that many growers currently use CO2 produced as a by-product from gas used to heat their greenhouses.

Q. 31	How should best practice requirements be incorporated into national direction? What factors should councils consider when determining what is economically and technically feasible at the site-level?

We would want to provide this on behalf of our members (in partnership with EECA), rather than relying on have councils defining what this is.

Support the proposed approach of EECA providing relevant best practice guidelines and also providing guidance on what is economically and technically feasible. It is important that this is be flexible over time, as things change and evolve, rather than being set in stone.

Factors which need to be included in determining what is economically and technically feasible should include:

- Consideration of an industry-specific transition plan/strategy (where there is one).
- Conclusions of any regional analysis of availability of alternative energy (e.g., biomass, electricity), where available and applicable
- The location of the site, in terms of proximity to alternative fuel sources
- Where the current assets are in their life cycle
- The costs (and affordability) of alternative options that the business has investigated
- Any advice received from experts in this area
- Consideration of the ability of the business to remain viable in the market throughout the transition.

It is important the specific needs and limitations of each industry is considered rather than applying generic best practice as a one-size-fits-all (or of applying industry specific guidance to another industry with different requirements).

Q. 33	Referring to each specific schedule, do you agree with the content of the GHG emissions plans for small (Schedule 1) and large (Schedule 2) sites?

We would like to propose a GHG emissions plan template that works for the greenhouse industry. This can be included as part of the scope of work in our Sector Decarbonisation Plan, and the detail of this can be provided at a later date.

Where a grower/business has undertaken an Energy Transition Accelerator (ETA) with EECA, we consider that this should largely satisfy the needs of a GHG emissions plan.

Q. 34	In your view, are the materials referenced in Appendix Two appropriate for each sector and across sectors?

The best practice material listed in Appendix Two does not appear to cater specifically to the covered crops sector.

Q. 35	Is there anything that has been overlooked in this section with regards to the reality of business practices? For local government: is there anything that you feel has been overlooked in this section with regards to the reality of consenting practices?

Other matters to keep in mind, include:

- There are sector-specific considerations which apply – for example, tomatoes must be sold when fresh. Winter production is needed to support cost of infrastructure. Tomato plants produce for 11 months. A grower's economic model is based on this. The threat of Australian imports is real - with increased production in Australia, and with NO carbon tax/pricing.

- The Paris Agreement speaks to a 'fundamental priority of safeguarding food security' and action in a manner that does not threaten food production. A key theme of HortNZ's submissions on climate related policy is the need to provide for our ongoing domestic food security. Policy that forces covered crop growers out of business due to the required speed and/or costs of transition, would likely have negative impacts regarding food security (depending on scale).

- There could be unintended consequences of transition ahead of it being economically viable – for example, carbon leakage through import of products from overseas where they do not face equivalent climate change policy (i.e we would expect that locally produced and transported fresh produce within New Zealand would have a lower emissions profile than imported vegetables). Loss of businesses in New Zealand due to our produce becoming uncompetitive compared to imports, would be an unfavourable outcome.

- There is likely to be a lot of change in this space as a result of the Climate Change Commission recommendations and upcoming emissions budget requirements. For example, economy-wide transition to lower emissions fuels could result in competition for biomass from several industries. This policy work should be cognisant of this wider context. There is a need to avoid being overly prescriptive, while balancing this with focused and certain policy direction.

- The viability of transition alternatives is highly site-specific. We suggest a fair and equitable approach to enable growers to transition profitably over time. We believe this can be done through an energy transition plan for the greenhouse sector which has flexibility in time steps to enable access to suitable energy options available.

NON-STATUTORY GUIDANCE ON NON-INDUSTRIAL EMISSIONS

Q. 36	Do you support the development of non-statutory guidance on how to consider wider GHG emissions (direct and indirect) through RMA planning and consenting processes?

In the interim – ahead of the new statutory framework coming into place to supersede the RMA and from 31 December 2021 Councils being enabled to consider direct and indirect GHG emissions on climate change – we agree that the development of non-statutory guidance may be a useful tool to assist Councils. This is the most pragmatic option given the status of comprehensive RMA reform.

Q. 37	What are the key areas that guidance needs to cover?

We consider that land use change is an area which guidance could cover. A transition to a low emissions economy is likely to drive land use change. At the same time, a changing climate will also drive land use change.

The key way in which guidance could assist in this area is by making it explicit that decision makers will consider the benefits of land use change to lower emissions land uses (and/or activities which would support that land use change e.g., water storage projects), such as horticulture (where this is a viable option).

There is an evidence base to support this, and land use change to horticulture was part of the Climate Change Commission's draft advice to Government:

- The Climate Change Commission's draft advice to Government included transforming a small amount of dairy land into horticulture, at a rate of 2,000 hectares per year from 2025.
- The Biological Emissions Reference Group estimates that that biological emissions from dairy are about 12 tCO2e per hectare, and between 3.5-2.1 tCO2e for sheep and beef. They estimate that biological emissions from horticulture range from 0.17 -1 tCO2e per hectare.

(As explained in HortNZ's submission to the Climate Change Commission – this does not have to come at the detriment of other environmental outcomes either).

This would not over-ride other environmental factors – but enable a balanced/full consideration of benefits that assists in moving New Zealand to our Zero Carbon target.

The consultation document notes that '*it is contrary to the policy objectives of this instrument to have local government making ad hoc decisions that complicate work underway in other sectors, for example, in agriculture, where the Government and the sector have established He Waka Eke Noa'*.

From HortNZ's perspective it is important to not create barriers to climate change adaptation and/or mitigation, and enable consideration of long-term climate change adaptation and/or mitigation. Guidance as sough above would not in our view conflict with He Waka Eke Noa.

Appendix 1

Phasing out fossil fuels – feedback from growers and industry experts

Global situation – greenhouse growers in Netherlands sector transition

TomatoesNZ and Vegetables NZ, with the support of EECA, commissioned greenhouse expert Elly Nederhoff to review the greenhouse industry's energy transition in the Netherlands, for key learnings and options which may be of consideration for application in New Zealand. The draft report is included in Appendix II.

The greenhouse industry in the Netherlands has a goal to be fossil-fuel by 2040 with growers given growers were given 2 decades to change to renewable energy sources. Below are two slides summarising the Netherlands energy transition:

ENERGY TRANSITION - what's happening in the Netherlands

Energy transition = moving from fossil fuels towards sustainable forms of energy

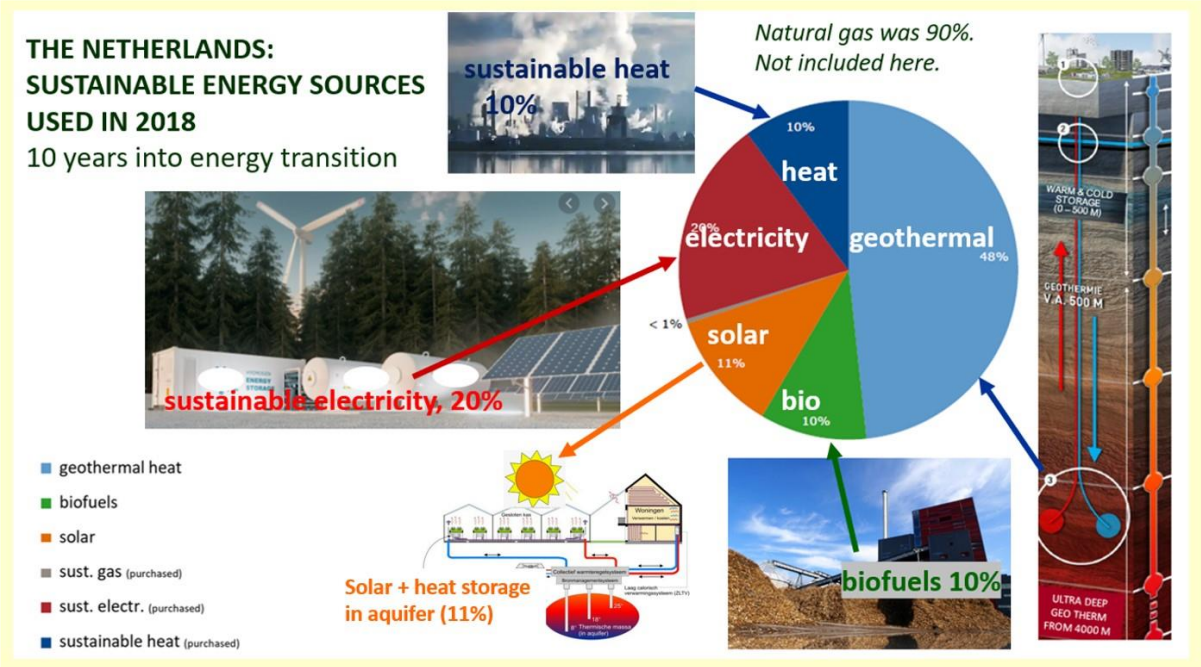
Dutch greenhouse industry is in middle of energy transition
2003: first 'closed greenhouse'. 2008: first geothermal heating
2019: government's decision to fade out natural gas
2021: no natural-gas-fed boilers & CHPs in new glasshouses
Existing ones permitted until 2030(?)

CHP = combined heat & power = co-generation

Step 1: radical energy saving! (a) without investments (b) with investments

Step 2: move to sustainable energy sources - investments needed

Step 3: be sustainable, low-carbon and economically viable (2040)



Options of interest for further investigation in New Zealand include development of high grade heat source from geothermal, availability of biofuels, development of hydrogen production, retrieving heat from low-grade sources for use through heat pump(s) and forming clusters with other users of high-grade heat. We noted in the Netherlands that building clusters of users has included developing a network for CO2 by taking the CO2 emitted at industrial sites to growers through the existing gas pipeline which is heavily subsided by government.

Grower case studies:

JS Ewers, Tasman – indoor and outdoor vegetable crops – Pierre Gargiulo

JS Ewers have taken a balanced approach to their energy efficiency and transition from coal as their primary heat source. They have achieved a 20% carbon emission reduction since 2015, through a better understanding of their heating demand and needs.

Their principles have been:

- Use less energy, by improving energy efficiency, and:
- Emit less emissions, by switching to a lower emission fuel.

They used a heating specialist to develop an energy plan with their staff to meet their crop energy requirements. Their completed energy projects include:

- **Installed Heat Flow Meters on Boilers**
- **Thermal Screens**: Retrofitted 6ha (60% of Blackbyre site)
- **Underground pipe**: Linked all glasshouses with over 3km of pipe
- **Buffer tank:** Installation of a 2 million litre hot water buffer tank
- **Boiler reduction**: Reduced from 8 to 3 coal operational boilers

JS Ewers were not previously using heat flow meters. These were installed to understand what boilers can and cannot do. They have noted retrofitting thermal screens is not easy and can be time consuming to do around crops, however they do work. They have reduced from 8 boilers to 3 (and use 1-3 depending on the environment); they have moved from 30MW boilers down to 9MW.

JS Ewers investigated electricity but it was not feasible for their location (it identified a 4MW cable down the State Highways was needed!). They also looked at solar but their main energy use is at the wrong time of the year for solar heating to be feasible.

Next steps include:

- Retrofitting the remaining 4ha glasshouses with thermal screens.
- Wood pellet conversion at leased properties.
- Biomass boilers – switching fuel from coal to biomass (supported by GIDI funding).

JS Ewers have noted that biomass supply needs to be within 100km. Their usage is 33,000T per year, peaking over 5 months (winter). They started with 1 supplier and now have 4 credible suppliers.

Key learnings have included looking at how they could reduce demand, developing an energy reduction road map and breaking it down to achievable parts over time.

Jade Garden –greenhouse cucumber grower, Canterbury – Robert Lindsay

2 ha greenhouses using 3 boilers (oil as the primary heat source). They have been working to minimise their energy loss where possible focusing on three key areas:

1. Effective use of their screens. Using climate control software for better use of their screens to conserve energy.
2. Linking boiler setpoint to outside temperature. Means not heating water unnecessarily on hot days.
3. Linking greenhouse temperature to incoming radiation (RTR strategy)

Over the past year they have achieved a 10% fuel saving compared with the previous year and no loss of yield.

New Zealand Gourmet – greenhouse tomatoes and capsicums, Auckland & Waikato - Roelf Schreuder

Based on the lessons learned from the workshop, I think there are limited options for making changes if using natural gas. Over the last few months I spent quite a bit of time exploring options and for a large grower many options have constraints with volumes required.

I used a 7.5ha glasshouse as a basis and first option was woodchip. To heat this, 10 to 13 truck and trailer loads of woodchip are needed per day plus you require a lot of storage area.

This is easy to do by buying a big chipper to chip the slash in forestry area's plus two truck and trailers for transport. I spoke about this with another large grower who had the same idea but together we were fishing in the same forestry area round Kaupakakapa. Point is that within no time we would clean that area up with supply becoming a problem after a few years. So for both parties we agreed that there is not enough woodchip in the Auckland area and this is not a preferred option.

Second option is biodigesters. Talking to others that already have digesters planned and did a cost calculation, it works out to be a $30 million capital investment to heat a 7.5 ha greenhouse. Another grower (SPL) did their study and came out at a similar amount.

Third option is geothermal and for this a study needs to be done about availability of underground heat. It looks to be the most cost-effective option although drilling a hole is $1 million at least and no access to CO2.

Fourth is waste oil but in my eyes not a real option.

Going forward energy saving and reducing the gas use is the focus. There is plenty of gas at least to 2050. I think we can realise a 30% reduction in overall gas use by using screens in all greenhouses.

For the CO2, we use 2,500 kg CO2 per week per ha and I think this has to be taken into account.

Without CO2, we can't ship produce by sea freight due to reduced shelf life and alternatively have to send it by airfreight which has a much worse carbon footprint than sea freight.

Therefore, my focus is on using natural gas but in a more sustainable way. Also the plan of Firstgas is to add 20% hydrogen to natural gas; this will not affect the burning and efficiencies of boilers but will reduce the carbon content by another 20%.

NZ Hot House Limited (NZHH), Auckland – greenhouse growers of tomatoes and vegetables – Simon Watson

Website: www.nzhothouse.co.nz

Contact: Simon Watson (Managing Director) 021 745 978

Background:

NZ Hot House is a 100% New Zealand privately owned producer of tomatoes and cucumbers based in Drury, just south of Auckland city.

We supply tomatoes nationwide plus ship approximately 10% of our production as export.

The business has been operating for more than 35 years and supplies by value about 25% of NZ's tomatoes.

NZHH operates primarily in the South Auckland and Franklin districts, employing more than 250 staff at peak season.

We have two company owned facilities, a 10.5 ha structure in Drury and an 8.5ha structure in Bombay. In addition, we pack and market for several independent growers.

Our goal has always been to produce local, fresh, sustainably produced and healthy tomatoes for New Zealanders to enjoy all year round.

Key issues that we feel need to be considered in this consultation:

What we need is a sensible phase out period of at least 10 years and preferably 15.

Stranded Assets:

The proposed changes are severe and will directly threaten the viability of the current stock of glasshouses in New Zealand. This will result in many of them being closed and demolished because they will no longer be profitable (stranded assets).

This will lead to significant job losses and losses of local production.

Typically, a modern glasshouse installation has a productive lifespan of at least 25 years. The current stock of national glasshouses is mostly between 10 and 20 years old. **What the industry needs is a phase out period to allow glasshouses that are only halfway through their economic life to extract the full value of that investment. Ideally this might be by 2035, which would avoid the overnight destruction of this industry.**

Alternative Energy Options:

We accept that there must be change and that alternatives must be sought.

With a new glasshouse, every effort would be made to include energy saving technology and the full utilization of renewable fuel options. Such a new build would have a typical lifespan of 25 years and would have the ability to recoup (amortize) this very considerable investment.

Retrofitting an existing glasshouse will bring energy savings, however it will be unlikely to earn back the very considerable investment in such a short time.

We are very concerned that the rush to retrofit glasshouses with alternative energy methods and sources will result is poor outcomes caused by hasty due diligence.

Current Glasshouse location limitations:

Current glasshouse locations are based on a few historic prerequisites. These include in order of importance:

- Proximity of natural gas gate station (tap in point)
- Availability of good volumes of usable water (10 litres per second)
- Availability of flat land
- Proximity to markets
- Availability of labor

The proposed new rules will change these prerequisites to include such priorities as:

- Proximity of biofuels
- Adjacent to geothermal sites
- Very large volumes of water for heat exchange (more than 150 litres per second)

While there are a handful of exceptions, most existing glasshouses in the current national stock cannot meet these prerequisites.

Glasshouses vs outdoor alternatives:

Glasshouse technology is extremely efficient food production using considerably less land, water, fertilizer than its outdoor equivalents. Indoor production significantly reduces food waste (spoilage from weather, insect or natural disaster).

The Australian tomato industry was primarily outdoor; however, the covered crop sector (glasshouse) has largely replaced their outdoor production at a rate of 8ha of outside to every 1ha of indoor production.

Food Security:

Without the year-round production that NZ glasshouses provide, it will be necessary to import food from elsewhere in the world. Most of this produce will be flown in at great expense and at a far greater cost to the environment.

Should there be a disruption to the supply of food from overseas sources **(as has been experienced in the recent COVID19 pandemic),** there is always the risk that as a country we will not be able to feed our population. Embedded, local production of fresh, sustainably produced food is vital to maintaining food security in NZ.

Food Safety and the dangers of imported uncontrolled food:

New Zealand's food production methods and food safety systems are very high. The integrity of NZGAP, GLOBAL GAP, HACCP food safety systems are well recognized internationally.

Removing our food security by severely limiting our productive capacity will force us to rely on other countries who do not have the same food standards or integrity.

Employment:

At NZHH we employ more than 250 South Aucklanders. We have many long serving team members and have a few families who are into the 3rd generation of employees.

To protect these jobs, we need the opportunity to see out the full economic life of our glasshouses (another 10 to 15 years) so that we are in a strong position to reinvest in new energy efficient and renewable fuel utilizing structures.

As the city of Auckland continues to grow, it is more important than ever to maintain businesses and industries that provide stable career opportunities for New Zealanders.

Grower Impact Statement and MBIE Submission – Southern Paprika Ltd 28 May 2021

Submitter – Southern Paprika Ltd (SPL)

Website: www.southernpaprika.co.nz

Contact: Blair Morris (General Manager) 027 525 2560

Southern Paprika Ltd (SPL) Overview

Southern Paprika is a 26 Ha Glasshouse operator located 50kms north of Auckland. We currently produce 7000 tonnes of Capsicums per annum for domestic and export markets of Australia and Japan. Currently our production is focused on Capsicum production, however we are able to convert our Glasshouse to production of many different vegetable crops within a short time frame based on requirements of the NZ market. The business has been in operation for 22 years and employees 160 staff. It has invested more than $60 million in capital cost and the annual wage bill is now over $7m, much of which is spent in the Warkworth area.

The Glasshouse industry is considered a large user of Energy and we have always been looking for alternative energy as a replacement for Natural Gas as part of a risk mitigation strategy. However, as we also use the Natural Gas for Co2 enrichment in the Glasshouses, (this increases yield by 15 %) there have been no alternatives.

The company's goal has always been to produce everything in a long term financially efficient and sustainable way. This includes energy, biological production, waste, transport and health.

Protecting the Greenhouse industry is essential to food security. Southern Paprika is located within 50 minutes of Auckland meaning low emissions and cost-effective supply to NZ's largest population base.

Glass House Operations and Energy Requirement

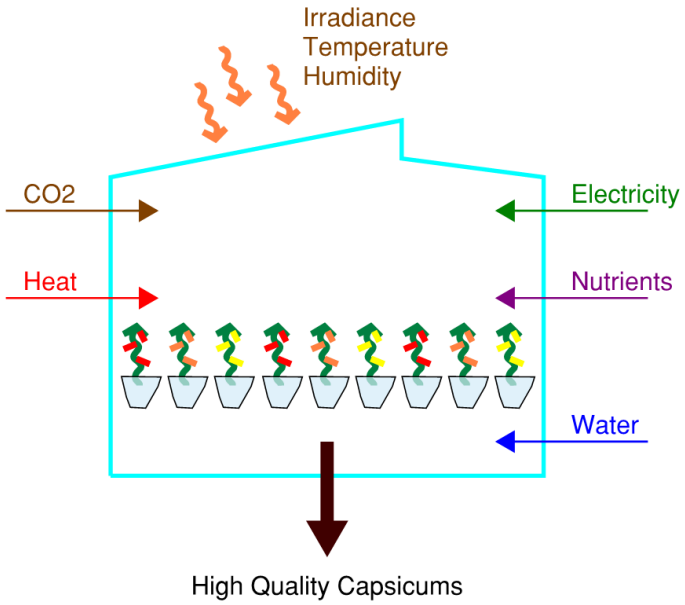
The SPL's main function is to produce high quality capsicums all year round. This is achieved by balancing several inputs to produce optimal growing conditions. Operation of the plant is the balance between what SPL can control and the weather external to the glasshouse. The daily changes of solar irradiance, ambient temperature and humidity provide the bounds in which the facility needs to operate. To maintain optimal growing conditions, SPL manage the following consumables.

- Electricity typically used for chiller rooms for storing the capsicums after harvest and
  for fans within the glasshouses
- Heating used for space heating and grow pipes for the plants
- CO 2 natural gas boiler flue gas is pumped into the glasshouse following operation of
  the boilers. This is used for CO 2 enrichment.
- Water & Plant Nutrients encourage crop growth

Space heating is achieved through rail pipes. These circulate hot water which heats the space to maintain optimal temperature within the glasshouse. The rail pipes are predominantly used through the evening when the external ambient temperature drops

and the glasshouse loses heat to the outside. To balance the need for heat through the evenings with the need for a carbon enriched environment through the day, the gas boilers typically operate through the middle of the day, with the heat generated stored in large thermal energy tanks adjacent to each energy centre. The CO 2 is then pumped into the glasshouse during the day. To balance the heat demand within the glasshouse, the systems ramp up and down corresponding to the internal temperature of the glasshouse. Figure 3 highlights a typical operating temperature set point for within the glasshouse.

These can vary through the seasons and is determined by the growing team.



CO2 Enrichment Requirements

Gas is predominately used to generate heat through the large gas boilers at each energy centre. The use of the boilers provides two functions: firstly to provide heat, used by the glasshouses, and secondly to provide CO 2, also into the glasshouses. The boilers are used through the middle of the day to charge the thermal tank with hot water and provide CO 2 into the glasshouse for crop development through the middle of the day. The boilers are typically not in operation from 7pm through to the early morning. Through this period, heating of the glasshouse is provided from the thermal energy tank , which is typically exhausted by early morning and the daily cycle is repeated.

The Co2 requirement provides an increase in quality and also a 15% increase in crop production and is therefore considered a necessary input for the Glasshouse production. A review of the required input of CO 2 through the use of the boilers for enrichment within the glass houses has been undertaken. Through analysis of the requested energy input for CO 2 enrichment, it suggests that approximately 10.8 - 21.6GJ per Ha of energy is required through the middle of the day for CO 2 enrichment. For further development of options, this is assumed to be 360GJ across the whole site (26Ha at 13.8GJ/Ha) daily for CO 2 enrichment. This equates to approximately 19.4tCO 2 per day. Relying on gas boilers to provide CO 2 results in a maximum possible reduction of 50% approximately 130,000GJ/year from a baseline of 275,000GJ.

Value of Natural Gas in the Glasshouse Industry

The need for heating and CO2 enrichment makes the Glasshouse industry most suitable for a continued use or partial use of such a fossil fuel. In comparison, all other industries only derive one benefit from the use of gas for heating without capturing and using the CO2 by product. All current proposals by the Climate Change Commission do not take into account that all industries are different and use the resources to derive different benefits. If the Glasshouses industry transition to a completely renewable energy source, the CO2 requirements remains, and the industry will ensure continued supply through gas or alternative options that still result in the creation of CO2. The end benefits being that the industry itself reduces emission through the crop enrichment and sequestration process.

Impacts of removing Natural Gas as the preferred Energy Source.

CO2 replacement

CO2 requirement in covered crops / Glasshouse in effect means that the gas boilers will continue, or alternative liquid CO2 will be used. The process of which may result in an overall increase in emissions from the industry when considering the overall creation and supply chain of alternative options eg transport, production, waste, emissions from alternative energy sources for heat

Maximising benefit of gas

With 50% of carbon emitted from the gas boiler process being captured and utilised by the Glasshouse crops, CCC need to consider if the industry standards proposed apply to all heat production. Perhaps consideration should be given to the net productivity benefits needs to be considered against a range of benefits to New Zealand and New Zealanders.

Productivity of land

As a company focused on only positive benefits for NZ and doing things in a sustainable manner, we believe the CCC need to consider the following:

- A Glasshouse production is approx. 30 times more productive per square meter of a field crop.
- We operate a closed loop water reticulation process with all nutrients collected and reused.
- Limited chemicals used due to climate control and Biological insect control where possible.
- Controlled environment protects reliability of supply compared with outdoor production.
- Year-round production providing import substitution and export revenue in peak periods.
- End of season growing material from Plants used on Avocado and other orchards as compost creating an environmentally sustainable benefit to additional food production for NZ.
- Scale and efficiency allow us to produce affordable produce year around, benefiting lower socio-economic communities in terms of healthy food at a lower cost.
- Our facilities use the latest in European production methods and we are refining this all the time.

Food Security and risk of Import substitution

Horticulture, including covered crops is all focused around obtaining balance in the plants to optimize production. If the balance is lost, crops are impacted through disease or similar and productivity is lost. The same balance applies to our business model where the availability and cost of inputs are equally as important as the plants and production themselves. The inputs impacting the industry to largest extent are labour and energy availability and cost. We are driven to ensure the most efficient model in all things related to these two inputs and if the availability or cost becomes unbalanced, the model is at risk. The end result being import substitution where product is no longer produced competitively in NZ with international imports able to land here at a lower price points for the consumer. When considering the emissions impact from such a result, the climate impact goes against what we are trying to achieve when considering the carbon emission from the transport legs and the increased production levels in the country of origin achieved through the standard gas boiler models and the transport component in servicing New Zealand at the bottom of the world.

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