SUBMISSION ON: Accelerating renewable energy and energy efficiency

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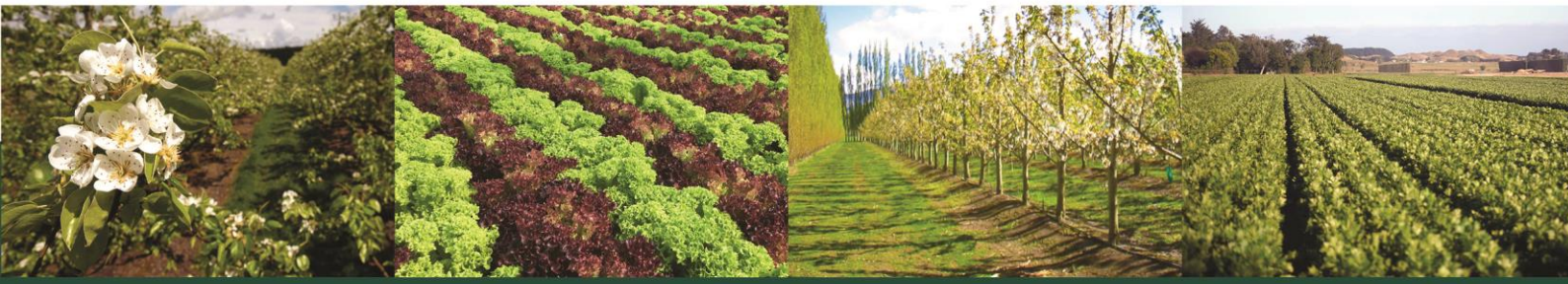
TO: Ministry of Business, Innovation and Employment

NAME OF SUBMITTER: Horticulture New Zealand

Supported by: Tomatoes NZ, Vegetables NZ



CONTACT FOR SERVICE:

Michelle Sands
Manager – Natural Resources and Environment
Horticulture New Zealand
PO Box 10-232 WELLINGTON
Ph: 04 470 5664
Email: Michelle.Sands@hortnz.co.nz

Introduction

Horticulture New Zealand (HortNZ) thanks the Ministry of Business, Innovation and Employment (MBIE) for the opportunity to submit on the Accelerating renewable energy and energy efficiency consultation document.

The details of HortNZ's submission are set out below.

Background to HortNZ

HortNZ was established on 1 December 2005, combining the New Zealand Vegetable and Potato Growers' and New Zealand Fruitgrowers' and New Zealand Berryfruit Growers Federations.

HortNZ advocates for and represents the interests of 5000 commercial fruit and vegetable growers in New Zealand, who grow around 100 different crop types and employ over 60,000 workers. Land under horticultural crop cultivation in New Zealand is calculated to be approximately 120,000 hectares.

The horticulture industry value is $5.7 billion and is broken down as follows:

Industry value	**$5.7bn**
Fruit exports	$2.82bn
Vegetable exports	$0.62bn
Total exports	**$3.44bn**
Fruit domestic	$0.97bn
Vegetable domestic	$1.27bn
Total domestic	**$2.24bn**

For the first time New Zealand's total horticultural produce exports in 2017 exceeded $3.44bn Free On Board value, 83% higher than a decade before.

It should also be acknowledged that it is not just the economic benefits associated with horticultural production that are important. The rural economy supports rural communities and rural production defines much of the rural landscape.

Food production values provide a platform for long term sustainability of communities, through the provision of food security.

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

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Executive summary

- HortNZ, TomatoesNZ and Vegetables NZ are strongly opposed to the proposal to require existing coal-fired process heat equipment for end-use temperature requirements below 100 degrees Celsius to be phased out by 2030.

- The consultation document does not appear to consider impacts of the proposals on greenhouse-grown crops. The impact of phasing out existing coal boilers for space heating of greenhouses will be devastating to indoor vegetable crop production, and therefore vegetable supply, particularly in the South Island. This is particularly because growers are 'price takers' and large capital investment is needed to set up greenhouses.

- We were not directly informed of these proposals or the consultation by MBIE, despite submitting regularly on the Emissions Trading Scheme consultations and on the 2018 Productivity Commission enquiry. As a result, we have had limited time to consult with the industry, however we have commissioned an NZIER report (attached as Appendix A) that describes the potentially devastating impacts of increasing carbon costs on the industry.

- Covered cropping is vital to ensuring New Zealander's are able to access freshly grown vegetables from a local supplier throughout the year, provides resilience within the domestic food system and is important for risk management at a national level.

- Greenhouse vegetable growers provide 2,400 jobs in the regions and South Auckland.

- The options proposed in this document combined with the cost of the Emissions Trading Scheme will result in growers going out of business, leading to more imported vegetables and potential carbon leakage.

- To our knowledge, other countries such as in Europe, do not impose any carbon costs on growers of greenhouse vegetables, and provide significant support for their growers moving to lower emissions.

- The 2015 Paris Agreement (and its predecessor the Kyoto Protocol), is strong on ensuring global food security and not reducing food production. It is important that New Zealand retains the ability to provide our own fresh fruit and vegetables, this includes considering not only availability, but also affordability. **The impact on food security of these proposals is disproportionate to the emissions potentially saved**.

- Measures targeting greenhouse heating will have minimal impact on NZ's total greenhouse gas emissions (<1% of NZ's total emissions), will very likely result in "carbon leakage" (more vegetable imports from countries not subject to carbon costs) and reduced diversity and reliance of vegetable supply and reduced food security for New Zealand.

- There are significant barriers for growers in transitioning to lower emissions energy sources. Growers are actively trying to reduce energy use and need support to transition low-carbon energy. There is a need to prepare for a more carbon constrained future, while maintaining domestic food security.

- We agree it is important to ensure that the Resource Management Act (and documents that implement it) support, or at least do not hinder, low carbon emission options; however, this is should not be the only mechanism required to support adoption of lower emissions technologies.

- Policy needs to develop lasting solutions not add tax or diminish business. **To maintain a viable covered crops industry will require a transition strategy with government and industry working together**. Support for indoor growers to access energy saving technology and assistance with capital for conversions and energy saving measures from Government is vital and requires a stepped transition pathway.

Part One: Context and industry overview

Horticulture and Greenhouse Gas Emissions

In general, HortNZ is supportive of the Government's action on climate change and is committed to responding to climate change challenges.

HortNZ considers that the transition towards the 2050 target needs to provide for a realistic and fair transition for food production, taking into consideration environmental, social and economic impacts, including global emissions and food security. Transition should not be at the expense of New Zealand businesses and livelihoods (owners and staff); especially those in the food production sector.

Horticulture has an important role to play in a low emissions future. The expansion of horticulture, in place of animal-based agriculture, has been identified as a method of reducing NZ's overall emissions[1]. HortNZ agrees that horticulture is an efficient land use, and diversification into more horticulture should be encouraged as a method of reducing farmers and New Zealand's emissions liability. However, in order for horticulture to expand and diversify to meet changing needs, ETS costs need to be considered and barriers removed.

In terms of the current New Zealand Emissions Trading Scheme (ETS):

- Covered crop growers of tomatoes, capsicums, eggplant and cucumbers are currently captured in the ETS. Growers of these products are eligible for an Industrial Allocation of NZUs, accounting for up to 60% of emissions, because they are considered to be moderately "Emissions Intensive and Trade Exposed" (EITE)[2]. For growers of other covered vegetable crops such as herbs and lettuce who may also use heating, there is no free allocation, so their ETS costs are not covered at all.
- More broadly, ETS costs are also present for transport, refrigeration and, post 2050, fertiliser, for all horticulture enterprises.

It is important that climate change policy decisions consider impacts on New Zealand's food security and potential for carbon leakage; increased costs without viable low emissions alternatives, is almost certain to result in carbon leakage or higher food prices for New Zealanders, without necessarily resulting in reduced emissions.

Food security

The 2015 Paris Agreement (and its predecessor the Kyoto Protocol), is strong on ensuring global food security and not reducing food production. It is important that New Zealand retains the ability to provide our own fresh fruit and vegetables, this includes considering not only availability, but also affordability.

There is a general assumption that New Zealand is the land of plenty and we will always have enough locally-grown food to feed our population, supplemented by imported food where there is demand. However, there are a number of factors putting pressure on, and creating competition for, the natural resources and infrastructure critical for growing fruit and vegetables. This is coupled with population growth, which will increase our food demands.

[1] https://motu.nz/assets/Documents/our-work/environment-and-agriculture/agricultural-economics/agricultural-greenhouse-gas-emissions/Land-use-change-as-a-mitigation-option-BERG-report.pdf

[2] https://www.epa.govt.nz/industry-areas/emissions-trading-scheme/industries-in-the-emissions-trading-scheme/horticulture/

Some of the costs of reducing emissions that will be borne by the horticulture sector (via the ETS or otherwise) will either be passed on to consumers, or result in significantly reduced domestic supply. For example, most of the vegetables grown in New Zealand are for domestic consumption, and increasing costs of vegetable production may threaten the ability of growers to continue to provide fresh affordable vegetables for New Zealanders. In addition, New Zealand is too remote to import most fresh vegetables, except by air-freight, which can only provide for a fraction of demand and has a high carbon footprint. Importing produce also increases biosecurity risks to New Zealand.

An example of the consequences of reliance on imported produce was highlighted in a recent article referring to 'global turbulence in food production' with reference to limes costing as much as $80 per kilogram, due to a price spike when local limes are out of season (when limes are imported)[3]. The article noted an increase in this price spike (for imported limes) citing less stable weather patterns in other parts of the world; a trend likely to continue as food production is affected by climate change. The article also quoted a recent Intergovernmental Panel on Climate Change report[4] into land use, which stated "*The stability of food supply is projected to decrease as the magnitude and frequency of extreme weather events that disrupt food chains increases*". This emphasises the importance of domestic food supply and food security.

Carbon leakage

It is important to consider the carbon efficiency of food produced in NZ relative to competitor food producers and whether or not those producers also face a cost for their carbon.

New Zealand's unsubsidised, but highly efficient, primary sector is exposed to competition from moderately to highly subsidised producers[5], for example New Zealand's pipfruit is the highest per hectare producer, with relatively low inputs.. If our costs rise and make us uneconomic, there will be an increase in emissions as higher emitting producers substitute domestic produce.

Australian grown greenhouse vegetables, which are not subject to any ETS or carbon costs although they use gas, oil, diesel and coal for heating. Small volumes of Australian-grown vegetables are already imported into New Zealand when local supply falls short, usually for seasonal/climatic reasons. These imports would increase if New Zealand growers go out of business due to banning of coal boilers before there are commercially viable alternatives available; or due to sharp increases in the ETS price (see Appendix A).

Successive New Zealand governments have worked hard to remove barriers to trade. It would be counterproductive for New Zealand governments to impose costs on New Zealand producers that would counter these free trade gains, and policies that would reduce New Zealand's emissions-efficient food production. Any loss of New Zealand's food production ability would likely be taken up by much less emissions-efficient producers overseas who are not facing the same costs[6]. That would be to the detriment of the climate change initiative.

In addition, we are not aware of any other country that includes greenhouse growers in their emissions trading schemes, for example:

[3] https://thespinoff.co.nz/food/10-01-2020/why-are-limes-so-freakishly-expensive-in-new-zealand/

[4] https://www.ipcc.ch/site/assets/uploads/sites/4/2019/12/02_Summary-for-Policymakers_SPM.pdf

[5] OECD Producer Support Equivalents show 1% for New Zealand compared to 18% average across the OECD, 21% in the EU and in some countries as high as 60%.

[6] Saunders, C, Barber, A, Sorenson, L, Food Miles, Carbon Footprinting and their potential impact on trade. (https://researcharchive.lincoln.ac.nz/bitstream/handle/10182/4317/food_miles.pdf)

- The European Union ETS applies to heavy energy-using installations in power generation and manufacturing industry and aviation (accounting for approximately 45 percent of the EU's greenhouse gas emissions)[7];
- The Californian cap-and-trade scheme applies to large electric power plants, large industrial plants, and fuel distributors (accounting for approximately 85 percent of California's greenhouse gas emissions[8].

The majority of covered crop vegetables are grown for the domestic market; there needs to emphasis on ensuring that NZ vegetables are not priced out of the market by emissions compliance costs when our international competitors do not face the same pressure or costs.

Sustainable transition

The transition towards lower emissions needs to be sustainable in an economic and social sense, taking into account linkages with employment, health outcomes and dietary change which supports emissions reductions.

Horticultural producers are mostly small to medium sized businesses with a few larger corporates in some sectors. Changes in costs can have a dramatic effect on the ability of these businesses to remain profitable and continue to offer job opportunities to New Zealanders. Horticulture is a significant employer and a key factor in the maintenance of provincial New Zealand's cultural and social wellbeing.

Recent research has exemplified the connection between eating patterns, climate change and health outcomes finding that eating more plant-based foods and minimising food waste were one of the most important ways individuals could reduce their personal climate footprint, while also having health gains and health system savings[9]. This research reported annual diet-related emissions reductions of between 4 percent (following New Zealand Dietary Guidelines) to 42 per cent (wastefree vegan diet), the latter being equivalent to one-fifth of the current emissions reduction needed to meet New Zealand's commitment under the Paris Climate Agreement. In this context it would be counterproductive to restrict production of plant foods. This research echoes the findings of the Eat-Lancet Commission, that food is the single strongest lever to optimize human health and environmental sustainability and without action, the world risks failing to meet the United Nations Sustainable Development Goals and the Paris Agreement[10].

A certain policy environment is required to encourage the investment required to transition to a low emissions economy without businesses becoming uneconomic and closing. Government investment is required to help support this transition towards alternative production systems and technology in a realistic manner and timeframe.

[7] https://ec.europa.eu/clima/policies/ets_en

[8] https://www.c2es.org/content/california-cap-and-trade/

[9] Drew, J et al. (2020) 'Healthy and Climate-Friendly Eating Patterns in the New Zealand Context'. Environmental Health Perspectives https://ehp.niehs.nih.gov/doi/full/10.1289/EHP5996

[10] Eat-Lancet. (2019). Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. The Lancet.

Part 2: Covered Crop (greenhouse vegetable) industry and process heat

Tomatoes New Zealand Incorporated (TomatoesNZ) is the national organisation representing New Zealand's 125 fresh tomato growers, almost all of whom grow in greenhouses. The fresh tomato industry has an annual farm gate value of $124m (March 2019), including export sales of about $10m per year.

Vegetables New Zealand Incorporated (VNZI) is the national organisation representing 550 fresh vegetable growers with a total gate sale value of over $420m, including approximately $40m in export sales. This includes approximately 120 greenhouse growers of crops including capsicums, eggplants, cucumbers, lettuces, chilies and herbs.

A 2018 report by NZIER evaluating the contribution of the covered (greenhouse) vegetable crop industries to New Zealand[11], using a Computable General Equilibrium (CGE) model found:

- Gross output (or turnover) of $295 million
- Contribution to GDP of $120 million
- 2,400 jobs
- Exports of $35-$40 million per year
- Spending of $34.3 million on heating (including electricity, coal, gas)
- This is an important industry for New Zealand, attracting stable jobs and skills in a growing market for covered crop products. It makes important contributions to GDP and general wellbeing through the employment it provides, exports it makes, and an increased use of technology
- It is a stable and growing industry which provides a significant contribution towards diversifying the New Zealand economy
- Helps to diversify the revenue sources for companies involved in agriculture and horticultural industries.

In response to this consultation, NZIER revisited this study in 2020 (attached as Appendix A) and determined[12]:

- The industry is struggling to deal with increased fuel and labour costs as a direct result of current policy settings (and prior to MfE 2019 Consultation Document suggestions),
- There have been significant changes on the supply side. After years of inconsistent and confusing policy signals from government the latest proposals by government have completely changed the outlook for the industry (through the introduction of a much higher carbon price and increases in the minimum wage).
- In an industry which has high capital costs where investments are made over 20 to 30 years the sudden imposition of these charges on their business is likely to be negative. While they can make changes at the margin it is more difficult to make substantial capital changes (i.e. such as replacing a coal boiler with a wood pellet boiler) without time to adjust and assistance.
- Using a blunt instrument such as an increasing carbon price is likely to dramatically downsize the industry shedding jobs and reducing employment opportunities in the regions and South Auckland. Local production will be replaced with imports.

[11] Valuing covered crops. A national perspective. NZIER report to TomatoesNZ and Vegetables New Zealand, March 2018
[12] The potential impact of the Emissions Trading scheme on covered crops. NZIER report to the Covered Crops Industry. March 2020

- Those hit hardest are the small producers (particularly those using coal in the South Island). Many are just hanging on by shedding labour and reducing the use of boilers. Some have already gone out of business as a direct result of the ETS.
- Growers are price takers, not price makers. They cannot pass on the increasing costs. In general, the extent to which agricultural and horticultural producers are able to extract premiums on an ongoing basis is very limited.
- The low hanging "energy" fruit has been picked. The pressure on energy bills means that many covered crops businesses have spent significant amounts of money conducting energy audits, hiring specialists to optimise boilers, and introducing new processes and practices to reduce their carbon footprint. They are about as efficient as they can be – given the current state of the heating technologies they are running.
- To reduce their carbon profile further will require a major overhaul of their heating technologies. The capital cost could be anywhere between $250,000 to $2,000,000 (depending on the size of the boiler).
- Increasing the nervousness among growers is that these alternative energy sources are unproven and are likely to take time – over the medium term – to be bedded into existing businesses.
- To maintain a viable covered crops industry a transition strategy is required with government and industry working together to:
    - To develop a detailed understanding of how the industry can move away from fossil fuels;
    - Examine how biomass production can assist the industry at the regional level;
    - Assist businesses with grants to move from coal/gas boilers to biomass boilers or other low-carbon energy sources.

Requirement for process heat

Process heat in the covered crop (greenhouse) industry is required to maintain a temperature necessary for efficient crop production. New Zealand has very high light levels and greenhouses are designed to capture energy to extend the natural growing seasons of the crops. Energy is the second highest single input cost (~30%), following closely behind wages. Without heating, the production season would be reduced to summer only (particularly in the South Island), yields would drop significantly at all times of the year, quality will fall (because the growing conditions in the greenhouse will not be optimal, resulting in more disease), and NZ growers would not be able to meet the volumes demanded by the domestic market, resulting in more imports.

The importance of process heat in the covered crop industry cannot be understated and as a consequence, the process heat is an important as part of our domestic food supply, as well as related economic activity and employment.

Process heat related covered crop emissions are a very small proportion of NZ's total greenhouse gas emissions

An MBIE factsheet on indoor cropping from 2016 (attached as Appendix B) stated that indoor cropping in New Zealand is a relatively small user of process heat compared to other sectors such as wood processing or dairy manufacturing. In 2016:

- Indoor cropping used 3.4 petajolues (PJ) of fuel for process heat (or 1.7% of New Zealand's total process heat demand).
- Most of this was used for low temperature (< 100º C) space heating.

- In that year, greenhouse gas emissions from indoor cropping was 220.8 kilo tonnes of carbon dioxide equivalent, or 2.8% of total process heat related greenhouse gas emissions.

Process heat emissions themselves make up 27% of all energy related GHG emissions (which is less than transport), which themselves make up 40 % of NZ's GHG emissions[12]. Therefore, covered crop emissions are <1% of NZ's greenhouse total gas emissions**.**

The importance of greenhouse growing will increase in the future in response to climatic variability

Covered cropping is vital to ensuring New Zealander's are able to access freshly grown vegetables from a local supplier throughout the year.

There has been an increase in the type and volumes of crops grown indoors for domestic supply, including lettuces, herbs and berries. These crops do not currently have access to free NZU allocations despite also paying ETS costs on their heating. Indoor growing is becoming more popular worldwide, including in New Zealand, because it mitigates the risks associated with unpredictable climatic events, requires less water per unit of output, and produces more consistent, high quality products.

Covered cropping provides resilience within the domestic food system and is important for risk management at a national level. The importance of different growing regions was demonstrated in the PSA response in the kiwifruit industry, having South Island growers free of PSA enabled Zespri to manage the supply chain. The covered crop industry plays an important role in levelling out market supply in shoulder and off seasons. This is particularly important when there are adverse weather events that impact on the few areas in the country where there is winter production of certain vegetables.

Another point to note, is an international move towards more covered cropping. This move will be essential to adapt the food production system to the changing, more volatile world climate while still producing enough food in a way that also uses less water and nutrients. Climatic variability, along with increased global demand for fresh produce, is already resulting in more indoor crop production, meaning that the factors impacting the current covered vegetable crop sector will begin to extend into other crops.

Investment and support (not regulation) is required to enable a transition to lower emissions alternative fuels.

The horticulture sector seeks investment in technology that will enable growers to transition the heating of these growing systems to economically viable, low emissions, alternative heating systems. Support for indoor growers to access energy saving technology and assistance with capital for conversions and energy saving measures from Government is vital.

Crops are grown close to markets throughout NZ, including some places where low carbon fuels are not readily available.

Energy efficiency

Amongst the industry there is a willingness to change and a recognition of the importance of sustainable energy. Growers have proactively been making changes and looking at options, however there is no longer any 'low hanging fruit'. As noted in the NZIER report (attached as

[12] Process Heat in New Zealand: Opportunities and barriers to lowering emissions, Technical paper January 2019. MBIE & EECA

Appendix A), growers are about as efficient as they can be – given the current state of the greenhouse heating technologies available to them.

Growers have refined their growing techniques over the past 5-10 years in an attempt to produce enough volume in winter to supply the market and keep prices stable year-round. However, it would not be possible to continue producing at the current level without ready access to heat, plus Carbon Dioxide (CO^2) augmentation to enrich growing by feeding plants.

Whilst growers have made significant gains in yield and energy efficiency (approx. 20% improvement) over the past 10 years, the current infrastructure is reaching its limits and there are not many opportunities for future improvements without significant re-investment in new greenhouses and/or energy technologies.

The costs to build a new greenhouse is approximately $2.5-3 million per hectare, with an approximate 25-year lifespan.

Growers need to have highly trained staff for a productive growing operation. To maximise the skill level of these staff the business needs to operate 12 months of the year. To achieve this, the business needs to be operating and this can only be achieved by heating the glasshouses over winter. From an employment perspective, it is less efficient to run the business for 6 months over summer.

Barriers to transitioning to lower emissions alternative fuels

Proven technology has recently become available from the Northern Hemisphere, such as installing biomass burners that can heat glasshouses, but these systems cost in the millions, which is cost prohibitive for many growers.

Feedback from the industry suggests that (aside from cost) the following barriers to transitioning to lower emission fuels exist:

- Biomass is seen as cumbersome and risky. In many areas there is not sufficient supply (the MBIE consultation document clearly demonstrates this issue) and/or there issues with the reliability or suitability of supply. In addition, in some areas there is not the infrastructure in place around reliable and cost-effective fuel (biomass) supply.
- Logistics challenges (e.g. it is estimated that a 10ha greenhouse would require ten truck and trailer loads per day of wood fuel, and would need sufficient storage space on site for the amount required to meet demand).
- Biomass requires significant changes to the boiler fuel supply system to manage the flow in order to handle wood waste due to the low bulk density. Converted boilers need more maintenance and cleaning.
- Some growers use waste oil as an alternative, however the supply of waste oil is limited and the implications of this alternative also need to considered from an air discharge perspective.
- Limitations with electricity network capacity (if electricity was used as an alternative) and potential vulnerability in supply, along with high costs.
- There is no gas supply in the South Island.
- EECA support is only for one-off demonstration of technologies and does not help most growers transition to high capital-cost emissions reductions technologies.

These challenges and costs are elaborated on further in the NZIER report (attached as Appendix A).

It is noted also that ETS changes (and other changes such as those proposed in this consultation document) are additional to other pressures facing growers in the context of compliance changes (including environmental, health and safety etc.).

In a New Zealand setting, transition to lower emission greenhouse growing systems requires:

- cost-effective technological solutions involving alternative energy sources and/or energy saving;
- expertise to support transition (e.g. expertise is required in the setup and use of biomass in boilers to ensure it is clean burning and safe)
- a reasonable transition period (e.g. taking into account the economic life of existing infrastructure);
- support to make transition a feasible business prospect for growers; and
- certainty of ETS settings.

HortNZ supports incentives to enable growers to transition to lower emissions growing systems. Until cost-effective alternative heating sources are available, an increase in the emissions costs will not drive emissions reductions but will put some growers out of business.

Part Three: Comments on the consultative process

HortNZ express concern over the apparent disconnect in the recent consultation that has been occurring with regard to the ETS and climate change policy and legislation.

There has recently been a number of consultation documents released from a number of agencies with similar, and in some cases, overlapping timeframes, covering similar issues in a piecemeal way. For example, since December last year consultation documents have been released on:

- Accelerating renewable energy and energy efficiency (MBIE – March 2020)
- New Zealand Emissions Trading Scheme: Proposed Settings (MfE – Feb 2020)
- Climate Change Response (Emissions Trading Reform) Amendment Bill (Environment Committee – Jan 2020)
- New Zealand Emissions Trading Scheme: Rules for auctioning (MfE – Dec 2020)

We were disappointed to not be informed of the consultation on the discussion paper ‘Accelerating renewable energy and energy efficiency’, despite being regular submitters on Ministry for the Environment consultations on ETS and climate change related issues, and on the Productivity Commissions Low Emissions Economy consultation in 2017-2018.

We were not informed of the Interim Climate Change Committee’s 2019 electricity inquiry which recommended phasing out of coal for process heat, even though the final report mentions covered cropping. We also did not know about the January 2019 consultation that preceded this on the Technical paper “Process Heat in New Zealand: Opportunities and barriers to lowering emissions” until January this year.

This has meant that we have not had the time to give the MBIE proposals the depth of analysis we would have liked to in preparing this submission.

We would like to see more analysis specifically on the horticulture industry impacts of these proposals, as the current consultation completely overlooks the impact on our sector (despite having significant impacts). We welcome dialogue and engagement with government so a pathway for the industry can be discussed.

Part Four: Comments on 'Accelerating renewable energy and energy efficiency' consultation questions

General comments

The consultation document does not consider impacts/options for covered crop growers with heating requirements

The consultation document does not specifically recognise food production (in particular greenhouse growing), which the proposed options would have a significant and devastating effect on.

The consultation document states: "*… the NZ-ETS is the key mechanism for reducing energy emissions. The ICCC estimates that switching away from coal to electricity or biomass at scale will become economic with emissions prices in the range of $60-$120/t CO2-e. Switching away from natural gas starts to become economic only above $120/t CO2-e*."

At that ETS price, many of our growers will have already gone out of business – refer to Appendix A for analysis of ETS costs and impacts.

The consultation document recognises the challenges of changing fuel source for higher temperature users of coal boilers; but fails to recognise the realties for lower temperature users, especially greenhouse growers in the South Island.

Covered crops growers will be disproportionally affected

"Low" and "medium" process heating has been targeted for reduction by phasing out coal boilers because it is seen as easier and lower cost than transiting high process heat users. However, covered vegetable crop growers will be hit significantly and disproportionately by proposals to phase out coal boilers.

Although the absolute cost of replacing space-heating boilers may be less than for changing the heating system used for making steel, the cost of removing coal boilers without a cost-effective heating alternative will be devastating for individual growers, even though they account for a miniscule proportion of NZ's emissions, and they are providing healthy, locally produced, food for New Zealanders.

The inclusion of greenhouse growers does not meet the option assessment criteria proposed by MBIE

Page 18 of the consultation document lists the number one consideration for assessing options is consideration of the following:

1. **Does the option have an impact on greenhouse gas emissions** (does it reduce emissions in an economically efficient way, is it complementary to the NZ-ETS, how much emissions reduction is expected?)

We consider that including covered crop growers does not meet this criterion:

Does the option have an impact on greenhouse gas emissions/how much emissions reduction is expected?

- Measures targeting greenhouse heating will have minimal impact on New Zealand's total greenhouse gas emissions (<1% of NZ's total emissions), and will very likely result in

"carbon leakage" (more vegetable imports from countries not subject to carbon costs) along with reducing diverse and reliable year round vegetable supply, and reduced food security for New Zealand.

Does it reduce emissions in an economically efficient way?

- Crops are grown close to markets throughout New Zealand, including some places where low carbon fuels are not readily available. In the South Island, where coal is the primary source of heating for greenhouses, tomato, capsicum and cucumber growers incur a higher ETS cost that those in the North Island; and South Island growers using coal recover less than the free ETS unit allocation target of 60% for "moderately emissions intensive" trade exposed activities. Growers of other indoor vegetable crops do not receive any free allocations.
- High volume production is key to growers' ability to remain economically viable. Consumers and retailers demand product that is high quality, safe, reliable and consistently supplied in volume. Over the decades, prices for vegetables have barely increased, while costs of meeting these demands have skyrocketed. The only way that growers survive is by growing greater volumes with the same infrastructure. They have done this through growing better varieties, better climate control, and improving crop management. Without heating, the required climate control to grow volume is impossible. A small number of growers may be able to produce for niche markets, such as "heirloom" varieties with low input systems, but these varieties are low yielding and difficult to grow, and will not meet NZ consumer demand for "everyday" affordable product.

One criteria for assessing the proposals is distributional impacts, such as whether any population groups such as rural communities, regions, workers, consumers, or Māori/iwi, are likely to be disproportionately impacted. We consider that the impacts on covered crops could be considered in this sense, as lower income families will be disproportionately impacted by higher food prices and lower employment in some regions as a result of covered crop growers going out of business.

Another sub-criteria for assessment is the costs and benefits of health and environmental options:

> d. **Health and environmental benefits and costs, e**.g., warmer homes, air quality, biodiversity

This criteria needs to recognise the importance of issues such as food security and food prices – which are important facets of good health and costs.

Complementary measures (to the ETS) should not involve greater financial penalties or costs for covered crop growers

The introduction to *Discussion Document – Accelerating renewable energy and energy efficiency* states (pg 10) that:

> *"The Productivity Commission notes that the emissions pricing [ETS] is needed to change behaviours and promote investment. However, complementary measures to the NZ-ETS may be necessary to promote a fair and efficient transition and to maximise opportunities from the transition in addition to carbon pricing. … other regulations and policies may be useful where emissions pricing is not driving change"*

We believe that the ETS is the correct mechanism for pricing emissions. It was designed to be market driven, providing a basis for preventing carbon leakage if and when other countries

price carbon. It provides for support, via the industrial allocations scheme, for producers when they face “carbon leakage”, and it incentivises low emissions production by allocating free units on the basis of production instead of emissions.

Complementary measures should not involve greater financial penalties or costs for covered crop growers that rely on fossil fuel, because, as the NZIER analysis has shown, this will only lead to indoor growers disappearing from the industry resulting in reduced domestic food security and more imports. Complementary measurers should be focused on supporting growers with the cost of transition, such as:

- Low/no interest government loans or grants towards capital infrastructure costs for energy reducing tools and technologies and low-emissions energy generation. For example, a grower may be able to apply for a rebate on their ETS payments made since the scheme started, to go towards emissions reduction feasibility studies and investments in new technology to reduce emissions.
- Government co-investment in low emissions energy production that growers can access directly. For example, development of modern geothermal schemes energy schemes that could provide one or several growers in an area with heat and power. This already exists for greenhouses in the Netherlands. This would require specialist expertise and investment capital.
- Measures to improve supply of other low emissions fuels. Currently biomass is not seen as an option, with lack of surety and quality of supply needed for growers to invest the significant sums required for new biomass boilers being one significant factor. The consultation document Appendix 4: Biomass fuel switching map (page 128) shows that in most areas where the majority of covered vegetable crops are produced there is nowhere near enough “residual biomass supply” (Auckland, Waikato, Christchurch) to meet the energy demands of those regions. Biomass boilers are also more challenging to use for growers that coal or gas. Conversion of existing coal boilers to biomass brings more operational challenges than investment in brand new biomass boilers.
- Some growers have investigated electricity as an alternative, but being rurally located and needing significant energy, the power companies cannot supply the amount of electricity that would be required due to transmission constraints. It is also cost prohibitive as a fuel source. For example, a South Island based greenhouse grower advised conversion to electricity would triple their energy costs.

Part A Encouraging energy efficiency and the uptake of renewable fuels in industry

SECTION 1: ADDRESSING INFORMATION FAILURES

OPTION 1.1 - REQUIRE LARGE ENERGY USERS TO PUBLISH ENERGY TRANSITION PLANS AND REPORT EMISSIONS

This should be voluntary rather than required. If the benefits of developing an energy transition plan can be demonstrated to covered crop growers, and the expertise is available to help growers develop them, then they will happen without compulsion.

Reporting emissions information could be captured through users’ ETS payments on fuel, without adding to the burden and cost of separate reporting, which would be an additional compliance cost for little gain. If growers can see the benefits of measuring emissions, they will do so.

Option 1.2: Electrification information package and feasibility studies?

Yes this could be beneficial, although many larger growers have already looked into electricity and found other constraints, such as transmission limitations. The effort may be better spent looking at reforms in the electricity sector to incentivise provision of electricity at a capacity and price that works for businesses; and reforms that make co-generation technologies more attractive by improving returns for electricity fed back into the national grid.

Option 1.3: Provide benchmarking information for food processing industries?

This would have limited value and is best driven by industry to ensure information remains up to date and relevant.

SECTION 2: DEVELOPING MARKETS FOR BIOENERGY AND DIRECT GEOTHERMAL USE

Q. 2.1 Do you agree that some councils have regional air quality rules that are barriers to wood energy?

Agree.

Please provide examples of regional air quality rules that you see as barriers to wood energy

We agree that regional air quality rules could be a barrier to wood energy and this (along with any other potential resource management barriers) is a relevant consideration, however we are not aware of any specific instances where rules have limited wood energy use. Although we do note that the Canterbury Air Plan includes permitted activity requirements associated for example, with moisture content (for wood chips) and a maximum combined net energy output capacity.

Q.2.2 Do you agree that a National Environmental Standards for Air Quality (NESAQ) users' guide on the development and operation of the wood energy facilities will help to reduce regulatory barriers to the use of wood energy for process heat?

Agree.

Technical guidance on managing the development and operation of wood energy (and interpretation of the NESAQ requirements from a wood energy perspective) would assist both wood energy users and Councils in implementing the NESAQ clearly and consistently across the country.

Q.2.3 What do you consider a NESAQ users' guide should cover? Please provide an explanation if possible.

As per the consultation document, we agree that the following would be useful within a NESAQ users' guide:

- Interpretation of the NESAQ requirements from a wood energy perspective (As above, this would enable both clarity of requirements and promote consistency in approach)
- Development of planning rules that would achieve desirable air quality without creating unnecessary impediment to the use of wood energy (This could be a very helpful and efficient way of streamlining wood energy rules that could

also promote consistency, without having to “reinvent the wheel” in every plan)
- Air quality outcomes of various models of wood boilers (this could streamline/simplify information requirements for applicants)
- Good examples of planning rules suitable for wood energy facilities (as above).

Q.2.4 Please describe any other options that you consider would be more effective at reducing regulatory barriers to the use of wood energy for process heat.

Other regulatory options that could be considered would be rules within the NEQAQ itself or in planning standards.

Q.2.5 In your opinion, what technical rules relating to wood energy would be better addressed through the NESAQ than through the proposed users’ guide (option 2.1)?

We note the advantage of having rules in the NESAQ is that they would have statutory weight (compared with a user guide).

Q.2.6 In your view, could the Industry Transformation Plans stimulate sufficient supply and demand for bioenergy to achieve desired outcomes?

Securing large-scale, long-term fuel supplies, such as for a shared combined heat-and-power (CHP) plant supplying a cluster of industrial and community energy users has the potential to stimulate demand from greenhouse growers, if it happens in their region.

Nelson/Marlborough would be a prime contender due to the relative availability of residual biomass supply, current reliance on coal, and lack of other options. Canterbury could be another, but the problem in that region is a lack of residual biomass supply. There may be other options for a regional cluster, such as a geothermal supply.

Q.2.7 Is the Government best placed to provide market facilitation in bioenergy markets?

More information is required in order to respond on this.

Q.2.8 How could Government best facilitate bioenergy markets?

Q.2.9 In your view, how can government best support direct use of geothermal heat?

The government could help facilitate and fund geothermal heat and energy plants in areas close to greenhouses.

Geothermal is increasingly used in the Netherlands, who are the world leaders in greenhouse growing technology.

There are already 17 geothermal projects heating greenhouses in the Netherlands. They are generally 2-3km deep with total capacity of 3PJ and at low temperatures, they produce combined heat and power CHP (source: geothermie.nl and Agriproject.nl). The schemes heat a number of greenhouses each plus produce power that is used by the other industries and the community.

One recent example in development is Trias Westland:

In 2017, 49 Westland greenhouse horticulture entrepreneurs united and committed themselves to the development of Trias Westland, an innovative geothermal heat project to make the greenhouse horticulture in the Westland. Now more than two years later with the commissioning of the first doublet (July last 26), 26 affiliated participants receive heat from a geothermal heat source in the Onder Chalk layer at a depth of 2.3 kilometers. Trias Westland is an initiative of HVC, Capturam, Royal FloraHolland and a large group greenhouse horticulture entrepreneurs. (Trias Westland press release September 2019) http://www.triaswestland.nl/.

Netherlands greenhouse growers have the advantage of scale – there are approximately 1,800ha of greenhouses (growing cut flowers and vegetables) compared to about 300ha (growing vegetables) in New Zealand - and they are closely clustered along with other industry. Currently >80% of Netherlands greenhouses are heated with gas (and use the CO2 to augment production) and they are more energy intensive than New Zealand greenhouses because they use supplementary lighting, which we do not. Therefore, they can make use of both the heat and energy produced by geothermal. The Netherlands geothermal developments have funding support from government.

It would be worth investigating whether there are some small-scale geothermal systems that could work in New Zealand. There is one large (12 ha) greenhouse vegetable grower using geothermal heat, at Mokai near Taupo (Gourmet Mokai - Tuaropaki Trust). The geothermal heat at that site is also used by the Miraka Dairy Factory.

There may be opportunities for the government to investigate the feasibility, and then potentially facilitate the development, of geothermal for greenhouses in an area such as Canterbury or South Auckland.

A disadvantage of geothermal heat compared to gas heating for North Island growers, is that burning gas provides CO2 which is piped into the glasshouse to increase plant growth and yields (by around 20-30%), whereas CO2 has to be bought in by tanks if other heating sources are used. Technology is under development to capture CO2 from other types of boilers (e.g. biomass), and use it in the greenhouse but that technology is not yet in commercial use in New Zealand.

What other options are worth considering?

Other new technologies such as Ground to Air Heat Transfer Systems (GHAT), Dutch Thermal Aquifer, photovoltaic glass, wind and solar are thought not to be able to provide the intensity of energy required for greenhouse vegetable production yet, but this has not been investigated in a New Zealand context.

SECTION 3: INNOVATING AND BUILDING CAPABILITY

Qn 3.1 Do you agree that de-risking and diffusing commercially viable low-emission technology should be a focus of government support on process heat? Is EECA grant funding to support technology diffusion the best vehicle for this?

We agree there is a gap in knowledge of new low-emissions technologies; a lack of assessment of these in a New Zealand context; and a lack of skills and capability in New Zealand to support low emissions technology development. Significant investment and coordinated effort among businesses, governments and researchers will be required to identify or develop such technologies.

Studies such as EECA's International Technology Scan for horticultural energy reduction technologies (currently underway) will provide a useful resource. However, that will only be a first step towards change, as there are still significant barriers to implementation, including the lack of ability for greenhouse growers to afford the new technologies.

EECA's technology demonstration fund has successfully helped some growers implement new technologies. However, the technologies have not then been picked up by others as they are still seen as cost prohibitive and of uncertain benefit.

Greenhouses vary greatly in their heating requirements and properties depending on: crop type; target market; type of greenhouse (e.g. plastic verses glass); location/climate; and growing philosophies, which contributes to the uncertainty. Growers involved in the demonstration fund report that they end up spending more of their own money on the technology, including tweaking to get it right, than they had first expected, along with costs in reporting and resourcing due to being part of the programme that they had not anticipated.

We support the proposals outlined on page 37 (option 3.1), i.e.:

- Increasing the funding available, to enable a wider range of technologies to be demonstrated across multiple sectors
- Broadening the objectives to include supporting market transformation and increasing capability of clean energy services
- Funding multiple deployments in different circumstances (e.g. process, scale, or sector) to support diffusion of successful demonstrations, and
- Further knowledge-sharing mechanisms, such as learning networks, site visits and technical guidelines. Knowledge sharing and the dissemination of detailed case studies across industry will be important to effectively de-risk technology for wider deployment.

Q3.3 For EIHI stakeholders: What are your views on our proposal to collaborate to develop lowcarbon roadmaps? Would they assist in identifying feasible technological pathways for decarbonisation?

We are not entirely clear why there has been a distinction made between the "EIHI" sectors named in the document and others, such as greenhouse crop growers, for which heating is also an integral part of the business and any changes in fuels or energy systems would involve significant cost, structural changes, and impact on their viability.

We agree that stakeholders with energy as an integral part of their businesses should welcome the opportunity to partner with government and other industries to identify long term opportunities and challenges, devise strategies, develop shared understandings and an optimal regulatory environment, and yes, these would help to identify feasible technology pathways.

Q3.4 What are the most important issues that would benefit from a partnership and co-design approach?

Identifying which technologies to focus on and invest in; identifying realistic pathways and timeframes; and optimal policy settings and enablers.

Q3.5 What, in your view, is the scale of resourcing required to make this initiative successful?

Ideally there would be resourcing/ funding from government to help develop low carbon roadmaps strategies, work with industry bodies and users.

SECTION 4: PHASING OUT FOSSIL FUELS IN PROCESS HEAT

Deterring the development of any new fossil fuel process heat

Q. 4.1 Do you agree with the proposal to ban new coal-fired boilers for low and medium temperature requirements?

Disagree. At the current time there is no viable alternative for South Island covered crop growers.

Q.4.2 Do you agree with the proposal to require existing coal-fired process heat equipment for end- use temperature requirements below 100 degrees Celsius to be phased out by 2030?

Strongly disagree.

HortNZ, TomatoesNZ and Vegetables NZ are strongly opposed to the proposal to require existing coal-fired process heat equipment for end- use temperature requirements below 100 degrees Celsius to be phased out by 2030 – for the reasons discussed earlier in our submission, particularly:

- There are no viable alternative to coal boilers;
- Growers cannot afford the transition. Growers using coal are already facing increasing ETS costs, making affordability of converting even more difficult;
- These growers will exit the industry as ETS costs rise, because they cannot afford to convert
- This will reduce food security, probably with no reduction in global GHG emissions, since the vegetables will be replaced with imports that are not subjected to carbon pricing (refer to NZIER report in Appendix A)

Q.4.3 For manufacturers: what would be the likely impacts or compliance costs on your business of a ban on new coal-fired process heat equipment?

As outlined earlier in our submission, until there are cost-effective feasible alternative heat sources for greenhouse growers in areas such as the South Island, a ban on coal-fire process heat equipment will drastically reduce the covered crop industry in New Zealand. Refer to NZIER report in Appendix A for further information on the impacts.

Likely impacts for growers who currently use coal-fired boilers to heat their greenhouses is that they will be forced to reduce production, reduce labour, and reduce profitability. For smaller growers in particular, without viable alternative sources of heating, they will be forced to go out of business, and will not be able to sell their businesses as a going concern because there will not be willing buyers. Refer to NZIER report in Appendix A for further information on the impacts.

Q.4.4 Could the Corporate Energy Transition Plans (Option 1.1) help to design a more informed phase out of fossil fuels in process heat?

It appears the Corporate Energy Transition Plans are focuses on large energy users, not low heat users such as covered crop growers.

Q.4.5 In your view, could national direction under the Resource Management Act (RMA) be an effective tool to support clean and low greenhouse gas-emitting methods of industrial production?

Yes – but only as a complementary measure.

The RMA is not the most suitable mechanism to adopt best available technologies, but should support achievement of these strategic outcomes over time (i.e not creating barriers to climate change adaptation and/or mitigation, enabling consideration of long-term climate change adaptation and/or mitigation).

We note that at present consideration of climate change (aside from natural hazard related risk) are relatively limited under the current RMA framework. The RMA framework should have the ability to consider how resource management decisions could support the achievement of these strategic outcomes over time (i.e not creating barriers to climate change adaptation and/or mitigation, enabling consideration of long-term climate change adaptation and/or mitigation) while also seeking to safeguard ecosystem health through limits to achieve bottom lines.

Q.4.6 In your view, could adoption of best available technologies be introduced via a mechanism other than the RMA?

Yes – the RMA is not the most suitable mechanism for adoption of best available technologies in the current context where, as detailed in this submission, there is a there is a lack of alternatives available or economically viable.

SECTION 5: BOOSTING INVESTMENT IN ENERGY EFFICIENCY AND RENEWABLE ENERGY TECHNOLOGIES

Q.5.1 Do you agree that complementary measures to the New Zealand Emissions Trading Scheme (NZ-ETS) should be considered to accelerate the uptake of cost-effective clean energy projects?

Support for uptake of new energy technology is critical, but with a “carrot” not a “stick” approach, as financial penalties and banning fossil fuels before alternatives are in place will result in businesses closing down.

Q.5.2 Would you favour regulation, financial incentives or both?

We believe financial incentives to assist with the transition to low emission heat technologies is the most constructive approach.

Q.5.3 In your view what is a bigger barrier to investment in clean energy technologies, internal competition for capital or access to capital?

Access to capital is definitely limited when their future is uncertain and shrinking.

Q.5.4 If you favour financial support, what sort of incentives could be considered?

Long term co-investment by government with industry, and or access to low cost loans, and/or rebates on ETS expenditure, should be considered.

Q.5.5 What are the benefits of these incentives?

It provides businesses with an opportunity to invest in new technologies where they otherwise would or could not have done so.

Q.5.5 What measures other than those identified above could be effective at accelerating investment in clean energy technologies?

The industry would like government to consider:

- Better linkages between its regional development objectives and its carbon zero objectives.
- Industry and government working together to develop a pathway that allows the industry to adapt over time.
- Developing a consistent approach across agriculture and horticulture, so that all covered crops industries receive a 90% rebate on ETS costs (up from 60% now for selected crops).

SECTION 6: COST RECOVERY MECHANISMS

Q.6.1 What is your view on whether cost recovery mechanisms should be adopted to fund policy proposals in Part A of the Accelerating renewable energy and energy efficiency discussion document?

We strongly disagree with the proposal to implement a levy on consumers of coal. Rather than incentivising change to low emissions this will be more likely to drive them out of business, as it further reduces their financial viability and therefore ability to invest in new technologies.

Coal users currently pay a coal levy which is built into the price they pay for coal. Proposing an additional levy on consumers of coal would result in increased costs to coal users, effectively taxing them twice.

Businesses are already wary of levies as “cost recovery mechanisms” because they do not see evidence of them successfully working the way they may have originally been designed.

Q.6.2 What are the advantages and disadvantages of introducing a levy on consumers of coal to fund process heat activities?

There are no advantages to our sector.

In the experience of growers who pay ETS costs there has been little benefit of increasing the cost of coal in terms of investment in new energy technology. Growers would like to see funds gathered by the ETS proportionally returned to those who participate in the scheme so they can be used to fund investment in low emissions transition.

Growers would need to see evidence that a levy would assist their individual businesses in the resourcing and costs they face with transiting their energy use.

Part B Accelerating renewable electricity generation and infrastructure

SECTION 7: ENABLING DEVELOPMENT OF RENEWABLE ENERGY UNDER THE RESOURCE MANAGEMENT ACT 1991

HortNZ has not had specific experience implementing the NPSREG, however recognise the need to enable the infrastructure that would support transition (including REG), and note the following points:

- National direction needs to be integrated, so that the outcomes sought are clear to decision makers. For example, the draft National Policy Statement for Indigenous Biodiversity consultation includes options which would limit the ability to develop geothermal energy (and limit the ability to give effect to the NPSREG)
- HortNZ see an opportunity for overarching strategic planning, including spatial planning, to account for both climate change adaptation and emissions reductions as part of this, including consideration of where renewable energy resources could be developed.
- 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. In our view, the transition to a low emissions economy and adaptation decision-making require strategic planning to achieve (social, economic, environmental, cultural and climate change) outcomes.

SECTION 8: SUPPORTING RENEWABLE ELECTRICITY GENERATION INVESTMENT

HortNZ agrees that electricity currently does not compare well with other fuel options on a cost per GJ basis for heating greenhouses, with electricity prices just too high to be cost effective.

Power Purchase Agreements (PPAs) that facilitate match-making and or assume the burden of merchant power price risk, plus aggregating small loads to achieve scale to match new sources of renewable electricity supply, could have potential for greenhouse growers who are likely to be too small to justify investing in renewable electricity projects on their own.

Deploying energy efficiency resources via electricity retailers or distributors would have no impact on current greenhouse energy efficiency measures, as they do not currently use electricity. HortNZ would prefer in the medium-term to see greater support for energy efficiency investments (such as thermal screens) via EECA, which would apply to all types of fuel use.

Government support, such as tax incentives, provision of subsidies and government co-investment, has assisted with moving greenhouse to low-carbon heating and electricity generation overseas e.g. for geothermal energy projects in the Netherlands, and will be an important contributor to this shift in New Zealand.

SECTION 10: CONNECTING TO THE NATIONAL GRID

South Island greenhouse growers report that aside from the higher unit cost of using electricity instead of other fuels, the electricity transmission capacity to their

properties is currently insufficient, meaning they could not change to electricity without a transmission line upgrade. HortNZ agrees that there are barriers to these upgrades and to enabling new connections that need to be addressed but has not developed a view on which of the proposed options would be the most effective.

End.

NZIER
NEW ZEALAND INSTITUTE OF ECONOMIC RESEARCH

The potential impact of the Emissions Trading Scheme on covered crops

NZIER report to the Covered Crops industry

March 2020

About NZIER

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Our long-established Quarterly Survey of Business Opinion (QSBO) and Quarterly Predictions are available to members of NZIER.

We pride ourselves on our reputation for independence and delivering quality analysis in the right form and at the right time. We ensure quality through teamwork on individual projects, critical review at internal seminars, and by peer review.

NZIER was established in 1958.

Authorship

This paper was prepared at NZIER by Chris Nixon.

It was quality approved by Mike Hensen.

Registered office: Level 13, Willeston House, 22–28 Willeston St | PO Box 3479, Wellington 6140
Auckland office: Ground Floor, 70 Shortland St, Auckland
Tel 0800 220 090 or +64 4 472 1880 | econ@nzier.org.nz | www.nzier.org.nz

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Key points

Objectives

After valuing the covered crops industry in 2018, the NZIER has been asked by the covered crops industry to make a high-level qualitative assessment of the impact of an increasing ETS carbon price on the covered crops industry.

What we found

The main findings from the industry interviews[1] are:

- The industry is struggling to deal with increased fuel and labour costs as a direct result of current policy settings (and prior to MfE 2019 Consultation Document suggestions)
- Using a blunt instrument such as an increasing carbon price with little time to react is likely to dramatically downsize the industry shedding jobs and reducing employment opportunities in the regions and South Auckland. Local production will be replaced with imports
- New potential industries such as cannabis are likely to be difficult to move out of the black economy because of ETS charges
- To maintain a viable covered crops industry will require a transition strategy with government and industry working together to:
  - To develop a detailed understanding of how the industry can move away from fossil fuels
  - Examine how biomass production can assist the industry at the regional level
  - Assist businesses with grants to move from coal/gas boilers to biomass boilers.
- Industry participants have been caught in a cost squeeze between government regulation (ETS charges and increases in the minimum wage) and declining real covered crop prices. The hardest hit are small producers in the South Island because of their limited access to alternative forms of fuel
- To reduce carbon emissions further will require major capital investments in biomass boilers – between $250,000 and $2,000,000 depending on the size of the boiler
- Alternative sources of energy are unproven. Therefore, any transition period will take time before those energy sources are bedded into existing businesses
- Wood pellets are a potential source of alternative energy. However:
  - The sudden conversion to wood pellets by covered crops and other industries would create supply constraints regionally. It would also drive the pellet price up to the point where covered crop products are likely to be unprofitable

[1] The industry structure consists of a number of large players, a small number of medium sized growers, and a dwindling number of small growers. Some of the large companies have overseas parent companies that are attempting to assist their local subsidiary company develop new energy sources. Still others are able to import product relatively easily.

- The experience of those who have converted to wood pellet boilers suggests it is very difficult to secure clean, plentiful, and consistent supply of quality dry wood pellets

- At a carbon price of $50 per tonne (given current technologies) the covered crops industry will be significantly downsized. Growers will not be able to provide the volume or range they currently do. Most product will be imported.

The industry would like government to consider:

- Better linkages between its regional development objectives and its carbon zero objectives
- Industry and government working together to develop a pathway that allows the industry to adapt over time, in a way that:
  - Maintained competitiveness in the covered crops industry
  - Developed a consistent approach across all covered crops so that the covered crops industries recovered a 90% rebate on carbon (up from 60% now for selected crops).

Impact of the proposed policy approaches

The ETS is already having a dramatic effect on the covered crops industry. Many growers believe they are caught in a bind between rising energy costs and an inability to raise prices in a competitive market.

Claims by MfE (2019) that growers can pass on costs to consumers are not reflected in grower experiences. Below we set out the likely impacts at varying ETS carbon prices.

Table 1 Summary of impacts at differing carbon prices per tonne

Given current carbon infrastructure

	$25 per tonne	$35 per tonne	$50 per tonne
Industry structure	Small sized growers about to exit	Small, medium, and some large growers either change what they grow or exit	Unlikely to be many growers left
Behaviour	All growers investigating other energy sources	Reduce energy consumption, start importing	Switch to imports
Performance	Static output	Declining industry	Drastically reduced industry
Profitability	Profitability falling. Some products have not had price increases in 10/15 years (capsicums)	Those still in business earn reduce profits and run-down business	At or below breakeven for most growers
Employment	Small players shedding labour	All players reduce labour	Sharply downsized
Product variety	A wide variety of product on sale	Restriction in product offerings	Restriction in product offerings

Source: Grower interviews

Caveats

We must stress that this assessment of impacts is based on comments from interviewees cross-checked where possible against our previous work on valuing the industry. The robustness of the analysis is influenced by the potential bias in the information provided.

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1 Purpose and scope

1.1 Introduction

The covered crops industry[2] has been a small vibrant industry that has made a solid contribution to the New Zealand economy and provided choice for New Zealand consumers. In March 2018 the NZIER found that the industry contributed $120 million per annum to GDP on a turnover of $295 million per annum. The industry also paid $56 million in wages per annum.

Also, many covered crops businesses had made great strides in reducing their chemical sprays, were highly efficient at using water and are important employers in the communities they are a part of in regional New Zealand and South Auckland.

Covered crops are heavily dependent on heating, particularly over the winter period. Its reliance on fossil fuels means that the New Zealand Emissions Trading Scheme (ETS) has a major impact on the covered crops industry.

The aim of this report is to:

- Outline the likely impact of the proposed changes to the Emissions Trading Scheme (ETS) on the industry
- Investigate how the issue around transitioning from energy sources that intensively emit greenhouse gases (coal, gas, diesel etc.) to energy sources that have much lower greenhouse emission (wood pellets, food waste etc.)

This report draws on industry data and demonstrates the impact of proposed ETS charges to:

- Ensure that government fully understands the impact of the proposed ETS changes on the covered crops sector
- Illustrate the need for a transition pathway to develop a viable domestic industry.

1.2 Research process

In our first report for the industry (March 2018) we established the covered crops sector's economic impact using verifiable production and value figures and an understanding of the inter-linkages between other activities (packing, grading, etc.) and the rest of the economy (energy, fertiliser suppliers, transport providers, business services, etc).

With the cooperation of the industry and the ability to triangulate industry information with official statistics, we have sufficient confidence that this information approximates the size and scope of the industry.

We have now gone back to growers to further understand the impact of the ETS on their business. Overtime these impacts are likely to be felt all along the supply chain and 'ripple' outwards to affect the rest of the economy.

[2] Covered crops includes: capsicums, cucumbers, eggplant, herbs, microgreens, sprouts, lettuce, tomatoes, and other crops grown under cover.

1.3 Supply chain

The supply chain impacts are divided into demand and supply side impacts (see NZIER 2018 and Figure 1 below).

Since our initial report was released demand has softened with:

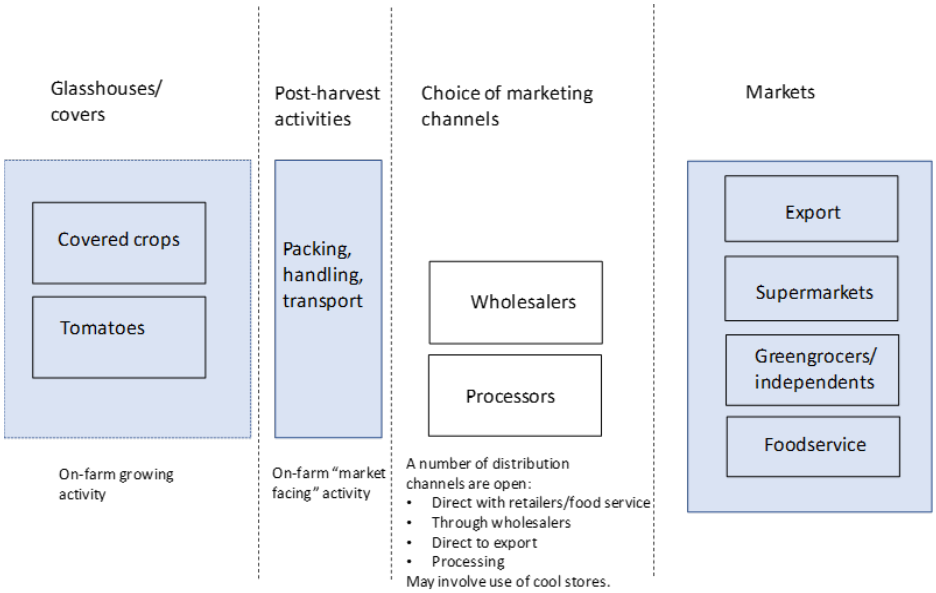
- Domestic consumption being relatively stable
- Tourism numbers while still growing are not growing as fast as they have over the past 5 years. Therefore, those producing high end products for the food services trade have noticed a levelling off in demand in the food service business (hotels and restaurants).

There have been significant changes on the supply side. After years of inconsistent and confusing policy signals from government the latest proposals by government have completely changed the outlook for the industry (through the introduction of a much higher carbon price and increases in the minimum wage).

In an industry which has high capital costs where investments are made over 20 to 30 years the sudden imposition of these charges on their business is likely to be negative. While they can make changes at the margin it is more difficult to make substantial capital changes (i.e. such as replacing a coal boiler with a wood pellet boiler) without time to adjust and assistance.[3]

The industry is consolidating as larger growers can realise economies of scale in growing, post-harvest activities, transport (particularly chilled transport costs). However, the impact of ETS charges is accelerating the exit of smaller growers and encouraging larger growers to replace domestic production with imports much faster.

Figure 1 Covered crops value chain



Source: NZIER (March 2018)

[3] MfE calculate that the marginal abatement cost is approximately $60 (Figure 18 p34, Potential Greenhouse Gas Mitigation Options and their costs, 2020)

ETS charges are particularly impacting on smaller growers who are paying 100% of the ETS costs (although all participants are reconsidering their position in the industry). These growers are either reducing their labour or closing their doors. Those exiting the industry cannot sell their businesses as a going concern since there are no buyers.

This indicates that the industry will shrink in many areas where the alternative employment is limited.

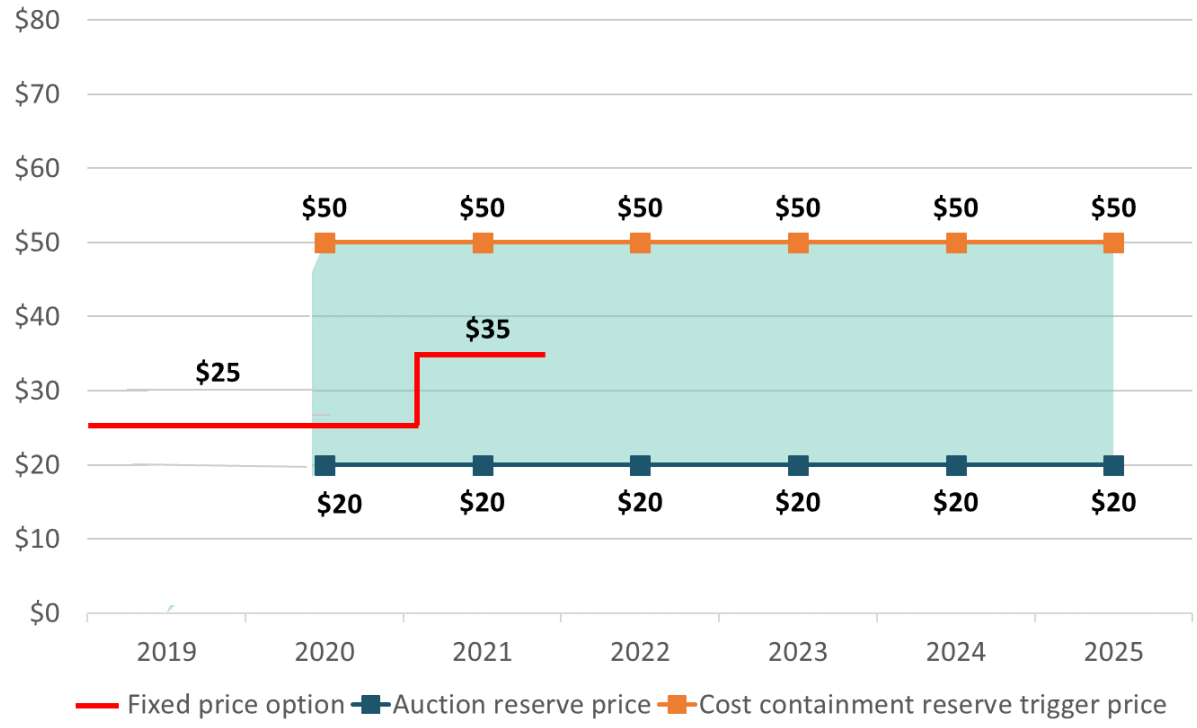
1.4 Reform of the ETS

Under the Paris Agreement of 2015 New Zealand has agreed to contribute average global temperatures well below 2°C above pre-industrial levels. New Zealand aims to reduce its domestic greenhouse gas emissions across all sectors. Forestry is also being used as a carbon sink removing carbon dioxide from the atmosphere and thus reducing our carbon target.

The ETS is the main tool that the government has to drive emissions reduction in New Zealand. As part of the structural change occurring to the ETS the government is proposing provisional settings for the ETS price controls between 2020 – 25.

The following Figure sets out the proposed carbon price controls and how they relate to the potential price path. The fixed price floor price is set at $20 per tonne of carbon (t CO_2) and the ceiling at $50 per t CO_2. The fixed surrender option price will be increased from $25 per t CO_2 currently and is proposed to rise to $35 in 2021 (see Figure 2) for those who immediately want to surrender at a fixed rate.

Figure 2 Proposed NZ ETS price controls (carbon price per tonne)



Source: MfE 2019

The impact on households is predicted to be moderate (MfE, 2019). For a middle income household with carbon prices between $25 to $50 per tonne the impact is forecast to be $3.40 per week. The analysis makes no comment on whether product choice would be limited in the face of increasing carbon prices.

The impact on firms is also expected by MfE (2019) to be moderate. Some of those facing imports have been given an Industrial Allocation of 60% that is set out the Climate Change Regulations 2010.[4] In covered crops these are producers of tomatoes, capsicums, and cucumbers. The phase down period for these allocations is also under review as part of the proposed ETS reforms.

Other covered crop growers have to pay the full ETS charge. MfE (2019) assert that these producers that do not face import competition are "*generally*" able to pass on their costs to consumers. No evidence is produced to support these assertions. This also suggests that New Zealand covered crop producers are price makers.

[4] The eligibility criteria for industrial allocations are set in the following document: : https://www.epa.govt.nz/industry-areas/emissions-trading-scheme/industrial-allocations/eligibility/

2 The impact of the ETS

2.1 Current impacts (between $25 and $30 per t CO_2)

2.1.1 The cover crops industry is stagnating

The change in industry sentiment over the past 2 years has been dramatic.

Two years ago, tourism numbers were increasing and the industry while small and vibrant contributed to regional communities through stable jobs. The industry was growing.

As policy directed ETS charges have increased and other government regulation have impinged upon their business (such as increases in the minimum wage) the squeeze on profits has been significant.

Those hit hardest are the small producers (particularly those using coal in the South Island). Many are just hanging on by shedding labour and reducing the use of boilers. Some have already gone out of business as a direct result of the ETS.

A symptom of the difficult situation many in the business face in the covered crops business is that they have not been able to sell their business as going concerns. The only value they have been able to extract is for the next best land use.[5]

This suggests that the MfE (2019) assertion that the industry can pass on the costs to consumers can be robustly challenged. A number of points can be made here:

- In the many years working for growers in agricultural and horticultural industries the NZIER has only encountered a few instances where growers are price makers and then only for short periods. Typically, in most cases other growers quickly mimic the growing decisions of the 'price-makers' and compete away the premiums. In general, the extent to which agricultural and horticultural producers are able to extract premiums on an ongoing basis is very limited[6]
- Auction systems are a major feature of agricultural and particularly horticultural markets in New Zealand. Typically, auction systems ensure that growers are price takers. As one covered crop grower remarked "*I don't know the price until our product is sold*"
- The New Zealand Treasury has always maintained that New Zealand agricultural producers are price takers on international markets. Given the structure and behaviour of horticultural markets in New Zealand it is very likely that price taking is also the norm in domestic markets.

As a result, many in the covered crops industry are taking a hard look at their businesses as they face heavy increases in energy prices and an increasing wage bill. This is occurring in a situation where real prices of their products have been reducing – for years.

[5] This figure varies depending on whether the land is sub-dividable or not.

[6] In trade modelling this phenomenon is recognised through so called Arimington elasticities. These elasticities can show the degree to which producers – producing highly valued products – can push prices up before substitution occurs.

2.1.2 The low hanging "energy" fruit has been picked

The two biggest costs are labour and energy in covered crops. The pressure on energy bills means that many covered crops businesses have spent significant amounts of money conducting energy audits, hiring specialists to optimise boilers, and introducing new processes and practices to reduce their carbon footprint. They are about as efficient as they can be – given the current state of the heating technologies they are running.

To reduce their carbon profile further will require a major overhaul of their heating technologies. The capital cost could be anywhere between $250,000 to $2,000,000 (depending on the size of the boiler).

Increasing the nervousness among growers is that these alternative energy sources are unproven and are likely to take time – over the medium term – to be bedded into existing businesses.

2.1.3 It is not just a matter of switching technologies

Growers have been casting around so they can further understand how they might move to other sources of energy technologies. Below we look at some of the difficult issues that need to be overcome before they can be used effectively and efficiently.

Wood pellets are the first cab off the rank

Wood pellets are seen as a viable alternative to coal and gas particularly in the South Island. A number of points need to be made about wood pellets:

- Wood pellets need to be sourced within 100 kms for them to be economic
- Much larger storage space is required. The space required to store wood pellets is 4 times larger than what is required for coal
- The number of wood pellet suppliers needs to increase. Currently, there are very few suppliers of wood pellets
- Currently wood pellets are between $50 and $100 an equivalent tonne higher in price than coal
- A wholesale conversion to wood pellets by all those currently burning coal would as one grower suggests "*culminate in supply constraints on available local supply of both 'dry' and 'green' biomass*". Growers also recognise that as the price of biomass increases, they are likely to be uncompetitive since constraints on biomass supply and transport costs will outweigh what they can sell their product for in the market
- Another likely impact is that the price of wood pellets would come under pressure as timber mills react to the increase in demand (to the point that it reaches export price parity). This demand pressure is likely to be underpinned as other transitioning industries also demand wood pellets (e.g. hospitals, schools etc.)

Further, the experience of those that have converted to wood pellets has been mixed. One producer has been unable to secure a clean, plentiful, and consistent supply of quality dry wood pellets over the past 15 years. They have had to pay a premium to local timber mills to divert "greenchip" from export which are focused on other products.

Other biomass projects are very uncertain

Other covered crops businesses are investigating using food scraps (that creates bio-gas) and bio methane. Both projects are very complicated and whether they succeed or not is unclear.

Niche energy sources can work

One small grower has been able to convert their boiler over to re-refined oil (i.e. waste oil from garages and fish & chip shops etc.).

However, they do point out that the amount of re-refined oil available is very limited and they have been "lucky" to find a supplier who has guaranteed their supply of re-refined oil.

Geothermal energy can also be used and some producers are taking advantage of this. However, there are only specific locations where this can be accessed. With the risks to covered crops businesses increasing (heating and labour costs) many investors would prefer alternative investments.

2.1.4 Behaviour of retailers and unexpected consequences

Basic economic theory would suggest that dramatic increases in taxes will drive some producers into the black economy. They will reduce their operations to "hobby" status and supply retailers under the table.

One producer commented that the way this has started to develop is that some retailers have been "*silly enough to advertise for covered crops using social media*". Retailers have been offering to buy speciality crops such as kale in exchange for coffees, muffins etc.

While this is currently small time, we should expect this sort of behaviour to increase as carbon prices increase. This will increase the costs of surveillance by local and central government.

2.2 What happens to covered crops at $35 per tonne of carbon?

Most businesses will restrict their heating. The impact of this will be to reduce production (increasing imports) and reduce labour.

Smaller business, unless they can move to alternative sources of heating, are very unlikely to be able to bear the costs associated with the ETS. Others will reduce their heating and change their crop mix.

The likely impacts on the covered crops industry are:

- The covered crops industry will reduce in size quite dramatically. The estimated 2,400 FTEs in 2017 will more than halve as small/medium sized producers reduce staff and production, and large businesses struggle
- Some major firms will dramatically decrease what they grow (shedding labour) and import more crops such as capsicums, cucumbers and tomatoes
- For crops other than cucumbers, tomatoes, and capsicums (imported and some locally grown), what consumer choice will be restricted i.e. leafy vegetables such as fancy lettuce, kale etc.

2.3 At $50 per tonne of carbon

Unless alternative fuels can be found and made to work at a practical level the covered crops industry will significantly reduce in size. Some growers may survive but it is unlikely they will be in a position to provide the volume, range, or at prices that the average consumer can afford.

Most of product will be imported.

2.4 Summary of ETS impacts a varying ETS prices

The impact of ETS charges as they increase is likely to be dramatic. At an ETS charge of $25 per tonne the industry is finding it difficult to survive. Smaller players are exiting the industry while medium to large scale businesses are contemplating their future.

At $35 per tonne most players will reduce their heating to a minimum. All covered crops businesses will reduce labour.

At $50 per tonne of carbon, importing will be the main activity.

Table 2 Summary of impacts at differing carbon prices per tonne

Given current carbon infrastructure

	$25 per tonne	$35 per tonne	$50 per tonne
Industry structure	Small sized growers about to exit	Small, medium, and some large growers either change what they grow or exit	Unlikely to be many growers left
Behaviour	All growers investigating other energy sources	Reduce energy consumption, start importing	Switch to imports
Performance	Static output	Declining industry	Drastically reduced industry
Profitability	Profitability falling. Some products have not had price increases in 10/15 years (capsicums)	Those still in business earn reduce profits and run-down business	At or below breakeven for most growers
Employment	Small players shedding labour	All players reduce labour	Sharply downsized
Product variety	A wide variety of product on sale	Restriction in product offerings	Restriction in product offerings

Source: Grower interviews

3 To remain a viable industry a transition pathway is required

All industry players have reduced their heating bills over the past 5 years by making their businesses as energy efficient as possible under current technologies.

Effectively forcing the industry to pay more for their energy with little time to react is likely to have a dramatic impact on local production volumes and ability to sustain employment at current levels within covered crops.

The ability to change rapidly is highly restricted because of the huge amount of capital invested in current industry technologies and the uncertainty around technologies that reduce greenhouse gas emissions (i.e. will they work and at what price).

3.1 A transition pathway will be good for emission reductions

The industry requires a stepped transition pathway that reduces the reliance on traditional heating sources (coal and gas). This requires:

- The development of a coherent strategy that links regional development objectives to carbon zero objectives
- The establishment of an approach where government and industry work together to develop timelines that plot a realistic pathway that allows industry to adapt to a significantly reduced carbon use future. This approach needs to:
  - Maintain international competitiveness in the covered crops industry
  - Have a consistent approach to all covered crops not just those currently designated as facing import competition by allowing all covered crops industries to recover a 90% rebate on carbon (up from 60% now for selected crops)
  - Delay the stepwise increase in ETS fixed price charges to fit in with a government-industry strategy
- Developing an assessment of the ability of the regional biomass supply out to 2035 and 2050 that could better inform the industry of the prospects of products such as wood pellets. Of particular focus is:
  - The price paid for wood pellets by industry
  - The supply constraints and the quality of supply
  - Establishing a detailed understanding of how further competition can be generated in the wood pellet business
  - Further understanding what other sources of biomass can be utilised at a regional level and what encouragement is required.
- Assist the industry with grants to change its capital configuration (e.g. conversion of coal to biomass boilers).

Using a blunt instrument such as an increasing carbon prices through the ETS is unlikely to assist the industry adapt in the short run. This is because of the significant capital investment required to change. The response of the industry will be to, reduce employment in the regions and South Auckland and reduce production. Imports will also increase.

This may reduce carbon emission that New Zealand reports against its targets. However, it will not stop carbon leakages (through imports) and may increase or maintain levels of carbon use in the black economy.

4 References

MfE (2019) Reforming the New Zealand Emissions Trading Scheme: Proposed settings. Consultation Document

NZIER (2018) Valuing Covered Crops. Report to Tomatoes NZ and Vegetables New Zealand. March 2018.

Indoor Cropping – Process Heat and Greenhouse Gas Emissions

Process Heat in New Zealand

FACT SHEET

What is process heat?

In the indoor cropping sector, process heat is used to maintain the temperature of a greenhouse for crop production. In 2016, indoor cropping in New Zealand consumed 3.4 petajolues (PJ) of fuel for process heat (or **1.7%** of New Zealand's total process heat demand). Most of this was used for low temperature (< 100° C) space heating supplied by hot water 'boiler' systems.[1]

Based on 2016 data, New Zealand had 70 indoor cropping sites using process heat; 45 in the North Island and 25 in the South Island.[2]

What is indoor cropping?

Indoor cropping refers to growing vegetables or flowers under cover in greenhouses (also called glasshouses or hothouses). A greenhouse is a structure with walls and a roof mainly made of transparent material, such as glass, in which plants requiring regulated climatic conditions are grown.

Indoor cropping is a capital intensive and high-tech form of production (high energy and labour inputs with high yields). New Zealand produces a variety of crops such as tomatoes, cucumbers, capsicums, chillies, eggplants, and lettuce.

Indoor cropping examples

Tomatoes

Most of New Zealand's fresh tomatoes come from indoor cropping, and currently, indoor tomato cultivation is a growing industry with a rise in the popularity of specialty tomatoes (i.e. increased demand for vine ripened, plum and cherry varieties). In 2018, fresh tomatoes in New Zealand had a farm gate value of over $130 million (end March 2018), with exports comprising about **9%** of the value. In 2017 New Zealand exported fresh tomatoes to 21 mainly Asian and Pacific Rim counties.[3]

New Zealand Government

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

EECA Energy Efficiency and Conservation Authority
Te Tari Tiaki Pūngao

Indoor cropping examples

Capsicums

Production of New Zealand's export quality capsicums is specialised and capital intensive. All export capsicums are produced through indoor cropping. Exports of capsicums were valued at $38 million in 2013. Japan is the largest market closely followed by Australia. Together these markets comprise **98**% of all capsicum exports.[4]

What was the fuel demand and greenhouse gas (GHG) emissions volume from process heat in this sector?

The indoor cropping sector is a relatively small user of process heat compared to other sectors, such as wood processing or dairy manufacturing. In 2016, indoor cropping used 3.4 PJ of process heat. This was **1.7%** of New Zealand's process heat demand in 2016.[5] This is equivalent to the total amount of energy consumed by about 90,000 households annually in New Zealand.[6]

In 2016, greenhouse gas emissions (GHG) from process heat use in indoor cropping was 220.8 kilo tonnes of carbon dioxide equivalent (CO_2-e). This was **2.8%** of total process heat related GHG emissions.[7]

12.5% of the energy consumed was from renewable sources. This was mostly geothermal energy. Some sites have converted from using coal or gas to biomass, however their biomass energy volumes are not clearly known. Renewable energy sources accounted for less than **1%** of the sector's emissions. The remaining **87.5%** of energy consumption was from non-renewable sources – and accounted for almost all **99.2%** of its emissions (see Figure 1).

Figure 1: Process heat fuel demand and GHG emissions for the indoor cropping sector 2016 – percentages (and actuals) by energy source[8]

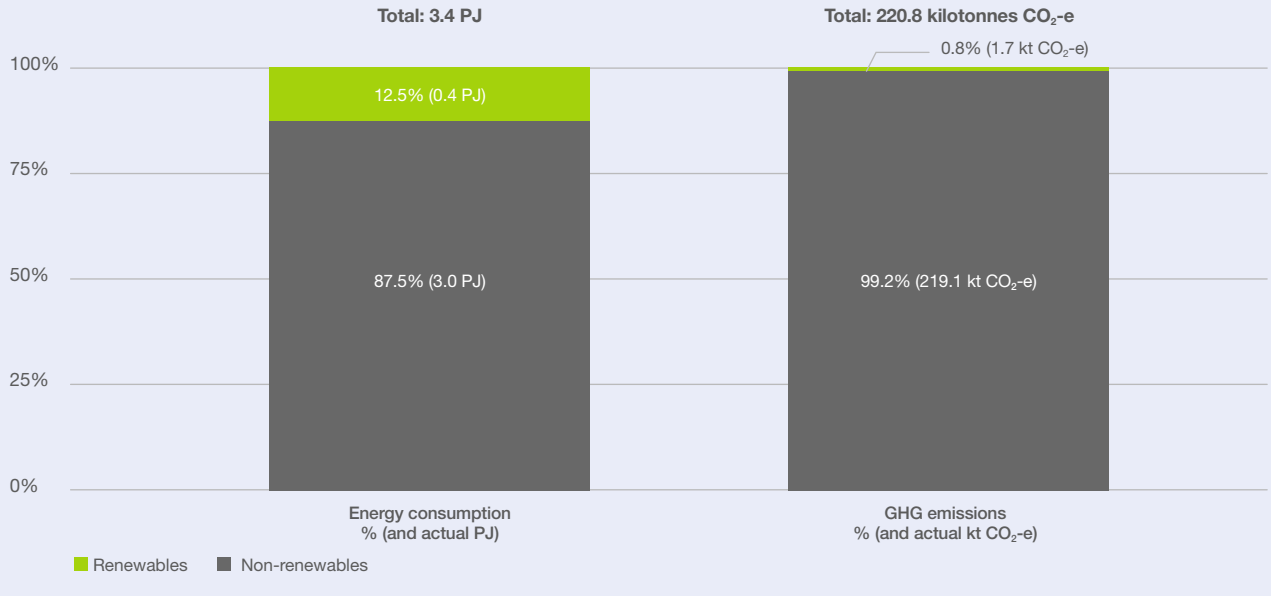


Figure 2: Process heat fuel demand and GHG emissions for the indoor cropping sector 2016 – percentages by fuel type[9]

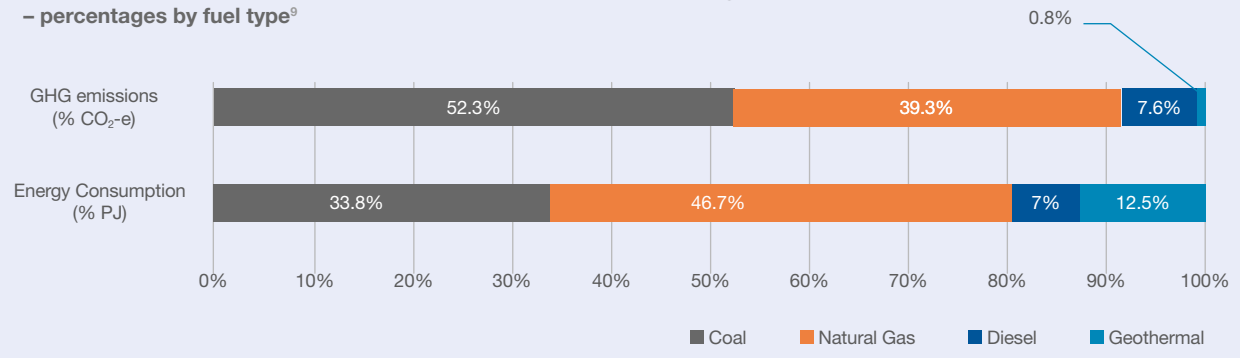


Figure 2 shows the percentages of fuel use and emissions from process heat in the sector. **33.8%** of energy consumption was from coal. This accounted for **52.3%** of all the sector's GHG emissions. In contrast, geothermal accounted for **12.5%** of consumption, yet less than **1%** of emissions.

Figure 3: Process heat fuel demand and GHG emissions for the indoor cropping sector 2016 – actuals by fuel type[10]

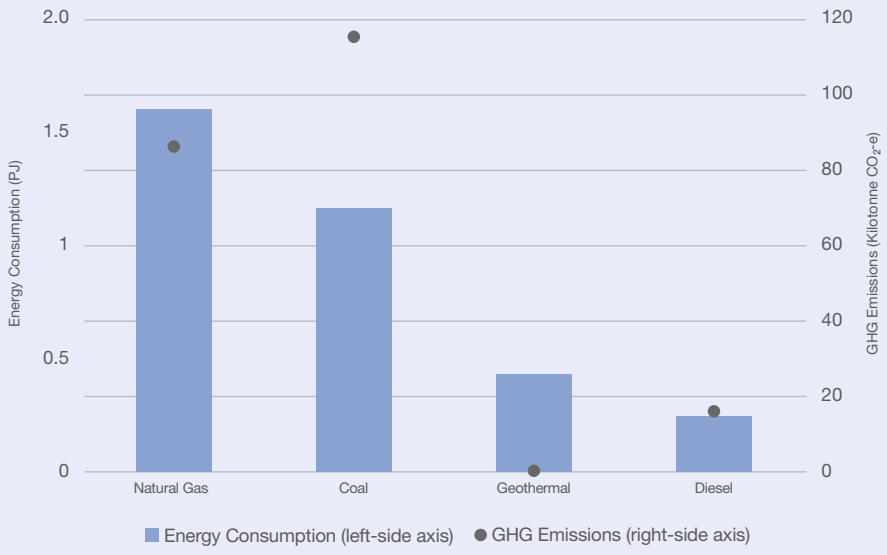


Figure 3 displays actual fuel demand and emissions by fuel type in the sector. **Reducing coal and natural gas consumption is the sector's biggest emissions-reduction opportunity.**

Sources

1. Source: 2016 Energy End Use Database (EEUD), EECA (2018) https://www.eeca.govt.nz/resources-and-tools/tools/energy-end-use-database
2. Source: 2016 Heat Plant Database, MBIE/EECA (2018). Note, the number of indoor cropping sites as at 2019 may be different from the 2016 data
3. https://www.tomatoesnz.co.nz
4. https://www.freshvegetables.co.nz/crops/covered-crops
5. Source: 2016 EEUD, EECA (2018)
6. Based on Statistics New Zealand household estimates data (as at September 2018) and MBIE 2017 Residential energy demand data (published 2018)
7. Source: 2016 EEUD, EECA (2018)
8. Source: 2016 EEUD, EECA (2018)
9. Source: 2016 EEUD, EECA (2018)
10. Source: 2016 EEUD, EECA (2018)