New Zealand Wine
Altogether Unique.

Roadmap to Net Zero 2050

THE NEW ZEALAND WINE INDUSTRY'S COMMITMENT TO MITIGATING CLIMATE CHANGE

Created by thinkstep-anz on behalf of New Zealand Winegrowers Inc. with support from EECA

EECA
TE TARI TIAKI PŪNGAO
ENERGY EFFICIENCY & CONSERVATION AUTHORITY

Introduction - Chair, New Zealand Winegrowers Environment Committee

Climate change is the biggest long-term challenge facing our industry. It will influence our choice of grape varieties, wine styles, viticultural techniques and regions, and importantly, the purchase decisions of our customers.

Our response to climate change is critical to the reputation of New Zealand as a producer of high value, sustainable, premium quality wine.

New Zealand produces just 1% of the world's wine and nearly all of it is exported: with more than 90% of New Zealand's wine heading to distant markets.

Global retailers are increasingly demanding greater commitment to environmental goals. Because all aspects of winegrowing and selling have an impact on the planet, being climate conscious is now a necessary way of life. That is why we are already striving to minimise our impact.

Since 1995, Sustainable Winegrowing New Zealand (SWNZ) has been our industry's leading sustainability certification programme. Over nearly three decades, SWNZ has gained an enviable reputation for the best practice in sustainable wine production, proudly represented by the SWNZ logo on millions of bottles of New Zealand wine that are exported around the world.

The Roadmap to Net Zero 2050 outlines crucial milestones and identifies key emission-reduction opportunities applicable across vineyards and wineries. By engaging together we will find better ways to achieve our emission reduction goals across the industry, including in our upstream and downstream supply chains.

I invite you, the winegrowers of New Zealand, to leverage the science-based insights contained in this Roadmap, to better understand the challenges and opportunities that lie ahead and to utilise these insights to guide your business. New Zealand Winegrowers is committed to emissions reductions in the goal of securing a sustainable future for generations to come.

Together we can make a positive impact on our industry, our wine, and our world.

Fabian Yukich,
Chair, New Zealand Winegrowers Environment Committee

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Contents

CONTENTS

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NEW ZEALAND WINEGROWERS (NZW)

NZW is the national organisation for the country's grape and wine sector, with over 600 grower members and 700 winery members. Established in March 2002, NZW is the only unified national winegrowers' industry body in the world.

Our vision is that, around the world, New Zealand is renowned for its exceptional wines.

SUSTAINABLE NEW ZEALAND WINEGROWING

SUSTAINABLE WINEGROWING NEW ZEALAND (SWNZ)

SWNZ is an industry-wide certification programme led by NZW. Launched by the industry in 1995, SWNZ is widely recognised as a world-leading sustainability programme and was one of the first to be established in the wine world. To be SWNZ certified, all members must complete annual submissions and undergo regular on-site audits conducted by an independent verification company.

600
grower members

1,840
vineyards

700
winery members

Over 96% of vineyard area is SWNZ certified, over 90% of wine is produced in a SWNZ certified facility and 10% of wineries hold an organic certification.

How we can reduce emissions

HOW WE CAN REDUCE EMISSIONS

Building on wine sector decarbonisation work we have carried out with support from EECA (Energy Efficiency and Conservation Authority), we are committed to achieving net zero emissions by 2050.

This Roadmap sets the starting point for this journey. It will change over time as we collect more data and technologies evolve.

What is net zero?

An industry achieves net zero when its total emissions and permanent removals balance out to zero. For the New Zealand wine industry, net zero means reducing the current 2022 (baseline) GHG emissions by 90% by 2050 and neutralising the remaining 10% of emissions through emission removal projects.

THE FIVE KEY OPPORTUNITIES TO CUT GREENHOUSE GAS (GHG) EMISSIONS FOR NEW ZEALAND'S WINE INDUSTRY ARE:

IMPROVING ENERGY EFFICIENCY

Improving the efficiency of fuel use (primarily diesel) and electricity to reduce energy consumption overall.

MOVING AWAY FROM DIESEL

Replacing diesel and other fossil fuels with alternate fuels, such as biofuel or green hydrogen and electrifying farm equipment and machinery.

DECARBONISING ELECTRICITY

Decarbonising New Zealand's electricity grid and/or adopting on-site solar energy generation.

INNOVATING THE VALUE CHAIN

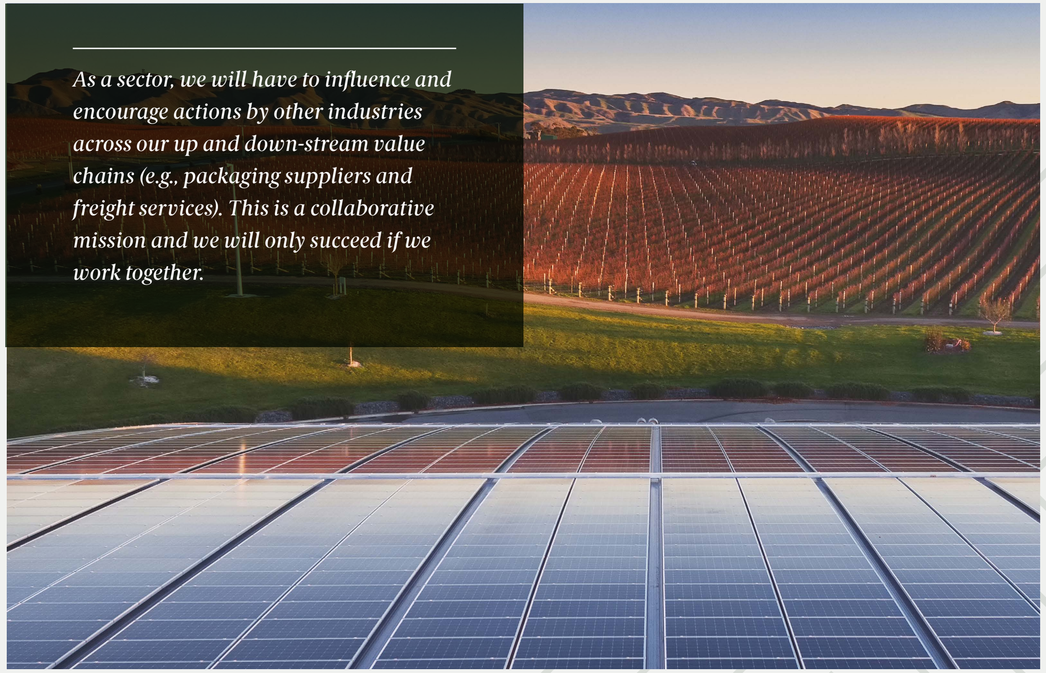
Engaging with suppliers to decarbonise goods and services such as packaging and transport.

USING CARBON REMOVALS

Reducing emissions by increasing the potential of our land to sequester and store carbon.

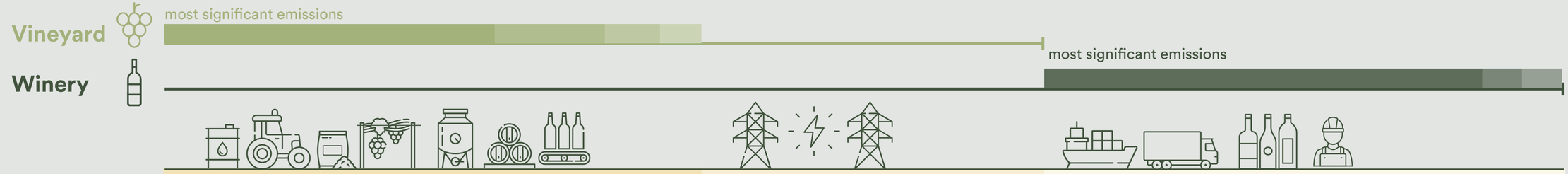
Without action, the expected industry growth to 2040 will significantly increase our emissions. To ensure the industry can keep growing without increased GHG emissions, we need to make the most of the opportunities above. This can be done by following five key principles:

- **measure emissions:** continuously improve GHG emissions accounting and set targets to reduce emissions
- **reduce energy demand:** prioritise energy efficiency in the short-term
- **innovate operations:** plan investments to transition from fossil fuels
- **work with the value chain:** suppliers of purchased goods and services – particularly packaging – should be net zero aligned
- **be ambitious:** remove emissions that cannot be reduced through emissions removal projects.



Where our emissions come from

WHERE OUR EMISSIONS COME FROM



SCOPE 1 | 44,000 tCO_2e

Direct emissions come from activities involved in running wineries and vineyards including diesel and petrol used to power machinery and vehicles. It also includes agrichemical and fertiliser applications, direct nitrous oxide emissions and emissions from waste management.

SCOPE 2 | 11,000 tCO_2e

Indirect emissions come from electricity, heat, steam and cooling used to run wineries and vineyards.

SCOPE 3 | 250,000 tCO_2e

Emissions from value chain including packaging and transport as well as services carried out by third party contractors.

BENCHMARKING OUR GHG EMISSIONS

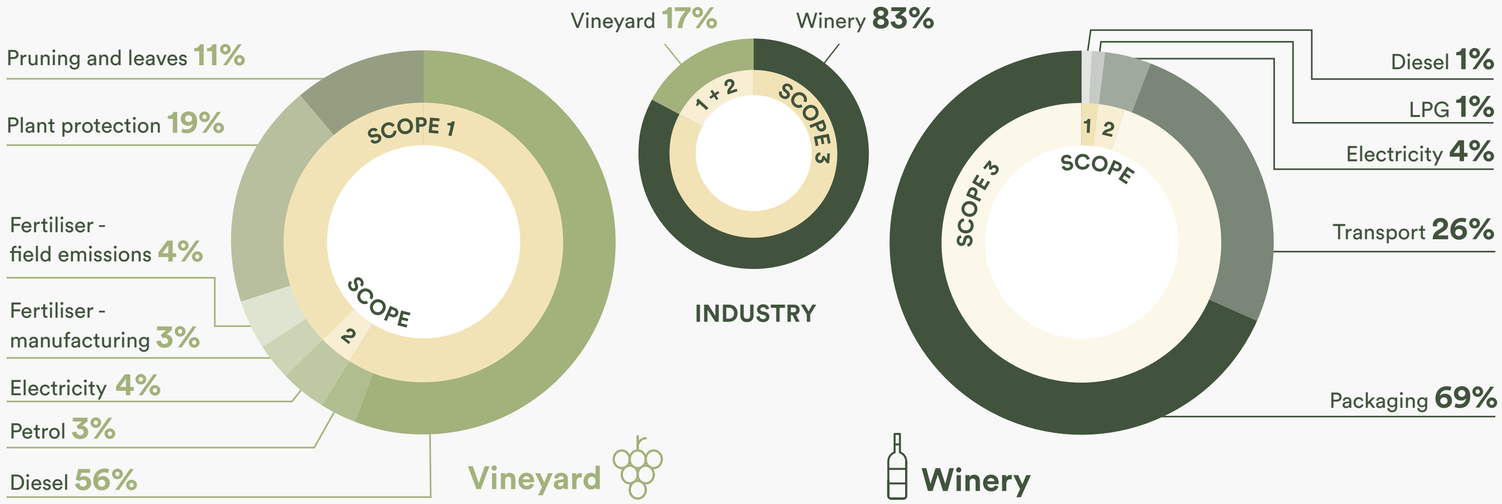
The SWNZ national GHG emission report for 2022 provided an initial baseline for the data used in this Roadmap.

However, that report only tells part of the story. Due to data gaps in recording Scope 3 emissions (e.g. glass) we estimated the total emissions associated with packaging and transporting wine to markets.

The estimated industry emissions for packaging are about 190,000 tCO_2e, bringing the total Scope 3 footprint to near 250,000 tCO_2e (compared to the 2022 study's 131,768 tCO_2e). The total industry footprint has been estimated at 305,000 tCO_2e.

Our national GHG emission reporting will improve over time as data gaps are closed and the quantity and quality of data increases. This will likely impact the Roadmap, which will be adapted and updated as data improves.

Table 1. Source: NZW: National Greenhouse Gas Emissions Report 2022



HOW SWNZ CAN HELP GUIDE PROGRESS

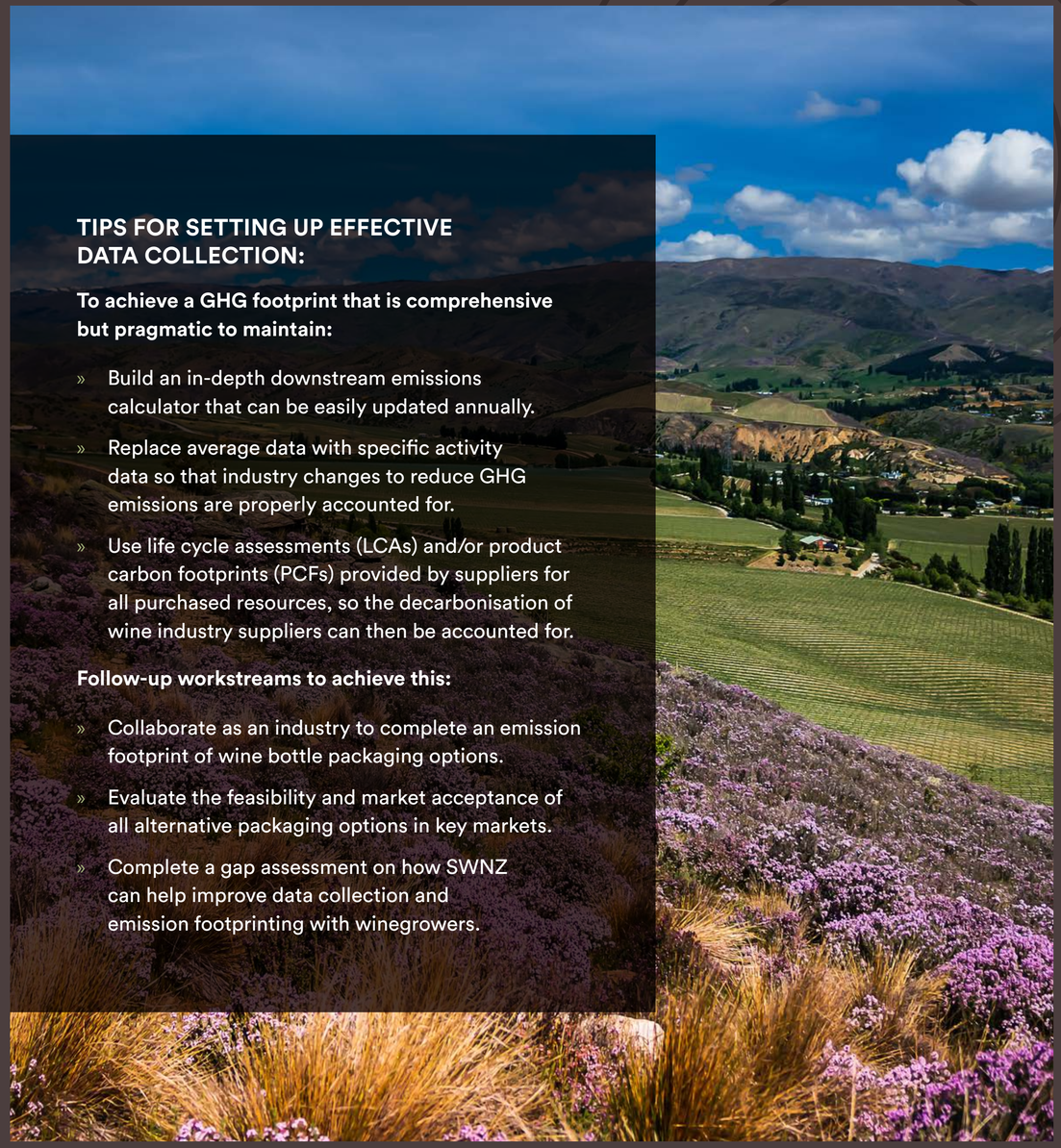
As the wine industry adopts emission reduction opportunities, the industry's footprint will change:

DIRECT EMISSIONS (SCOPE 1)	INDIRECT EMISSIONS (SCOPE 2)	SUPPLY CHAIN EMISSIONS (SCOPE 3)
are reduced as activities that are currently fuel-based are electrified.	initially increase as activities are electrified, then decrease as the grid decarbonises.	are likely to remain highly significant to the industry's footprint and are likely to increase as more GHG data is collected for the value chain.

Currently, SWNZ requires members to report on direct and indirect emissions and incorporates some supply chain emissions into its national and regional reporting. This provides national data on GHG emissions and industry approaches to mitigation. Streamlining and improving this reporting will help inform progress towards our net zero goal.

It is recommended that SWNZ provide members with further guidance on emissions across all scopes by drawing from case studies of wine companies that have undertaken full life cycle assessments of wine production. This information can be shared with members and adapted for regional profiles.

This guidance will be further strengthened as emissions accounting service providers create new products that assist members in keeping an inventory of emissions across all scopes that use verification processes (reducing costs associated with data collection).



TIPS FOR SETTING UP EFFECTIVE DATA COLLECTION:

To achieve a GHG footprint that is comprehensive but pragmatic to maintain:

- Build an in-depth downstream emissions calculator that can be easily updated annually.
- Replace average data with specific activity data so that industry changes to reduce GHG emissions are properly accounted for.
- Use life cycle assessments (LCAs) and/or product carbon footprints (PCFs) provided by suppliers for all purchased resources, so the decarbonisation of wine industry suppliers can then be accounted for.

Follow-up workstreams to achieve this:

- Collaborate as an industry to complete an emission footprint of wine bottle packaging options.
- Evaluate the feasibility and market acceptance of all alternative packaging options in key markets.
- Complete a gap assessment on how SWNZ can help improve data collection and emission footprinting with winegrowers.

EVALUATING OUR DECARBONISATION OPPORTUNITIES

The reduction opportunities summarised below are evaluated based on their feasibility to adopt (based on how available the technology is in 2024 and perceived market acceptance), emission reduction potential, and financial viability today and in the future.

There are some things our industry can't control that might have a big impact on our emission reduction journey. These include the decarbonisation of the electricity grid and freight. They are not included in this table but are factored into our calculations.

KEY DECARBONISATION STRATEGIES TO ACHIEVE NET ZERO WINE IN NEW ZEALAND BY 2050

DECARBONISATION OPPORTUNITY	VINEYARD AND/OR WINERY	FEASIBILITY	EMISSION REDUCTION POTENTIAL	FINANCIAL VIABILITY (2024)	FINANCIAL VIABILITY (2050)
Fuel efficiency	Vineyard + Winery	High	Low	High	Medium
Alternate fuels – biofuel	Vineyard + Winery	High	Medium	Low	Medium
Alternate fuels – hydrogen	Vineyard + Winery	Low	Medium	Low	High
Electrification	Vineyard + Winery	Medium	High	Medium	Medium
Carbon removals	Vineyard	Medium	High	Medium	Medium
Electricity efficiency	Vineyard + Winery	High	Low	High	Medium
Renewable energy procurement	Vineyard + Winery	High	Medium	Medium	Medium
On-site solar energy generation	Vineyard + Winery	High	Medium	Medium	High
Lightweighting glass bottles	Winery	Medium	Medium	Medium	Medium
Low carbon glass manufacturing	Winery	High	Medium	Medium	Medium
Bottling in market	Winery	High	Medium	High	Medium
Alternate packaging materials	Winery	Low	High	High	High
Data improvements through SWNZ	Vineyard + Winery	High	None	High	High

Legend rating

- High
- Medium
- Low
- None
- Vineyard
- Winery

EXAMPLES:

Fuel efficiency is rated low for emission abatement potential because it has a lower impact on emissions than changing to an alternative technology (e.g. electrification using renewable electricity or a transition to green hydrogen). However, it scores well for feasibility because it can be actioned now.

Electrification, meanwhile, represents a big reduction in carbon intensity because the GHG emissions of electricity in New Zealand are considerably lower per unit of energy when compared against diesel. However, it has a higher associated investment cost to adopt.

* Low carbon glass is using manufacturing processes that reduce carbon emissions (e.g., using renewable energy and/or reducing the amount of energy needed to produce glass.)

HOW TO GET THE WHEELS TURNING

New Zealand vineyards and wineries will need to take action now to move towards net zero by 2050.

Emission reductions vineyards

	2030	2040	2050
SCOPE 1*	-3	-50%	-75%
SCOPE 2*	-60%	-100%	-100%
SCOPE 3	13%	31%	31%

* most significant emissions

Emission reductions wineries

	2030	2040	2050
SCOPE 1	-7%	-68%	-100%
SCOPE 2	-60%	-100%	-100%
SCOPE 3*	-1%	-2%	-39%

* most significant emissions

BY 2030

Set up your long-term strategy to decarbonise
Target: Up to 5% industry emissions reduction (10,000 tCO_2e)

WHO	OPPORTUNITY	LIST OF POTENTIAL ACTIONS
	Improve energy efficiency	» Complete energy audit » Complete EECA energy efficiency checklist » Set a long-term strategy
	Procure renewable energy	» Procure biofuel for machinery » Procure renewable electricity (until the national grid becomes 100% renewable)
	Update the industry carbon footprint	» Increase and improve data for Scope 3 emissions (agrichemicals, packaging, transport, etc.) and update the footprint as soon as possible
	Divest from fossil fuels	» Develop a strategy to replace diesel and other fossil fuels » Review if you can electrify your operations » Review if you can adopt hydrogen » Analyse the cost-benefit of generating solar energy on-site
	Engage with suppliers to decarbonise packaging	» Consider net zero aligned targets in packaging contracts » Complete market research for alternate packaging materials » Review options for lower carbon packaging » Review transport options » Commission life cycle assessments for packaging

BY 2040

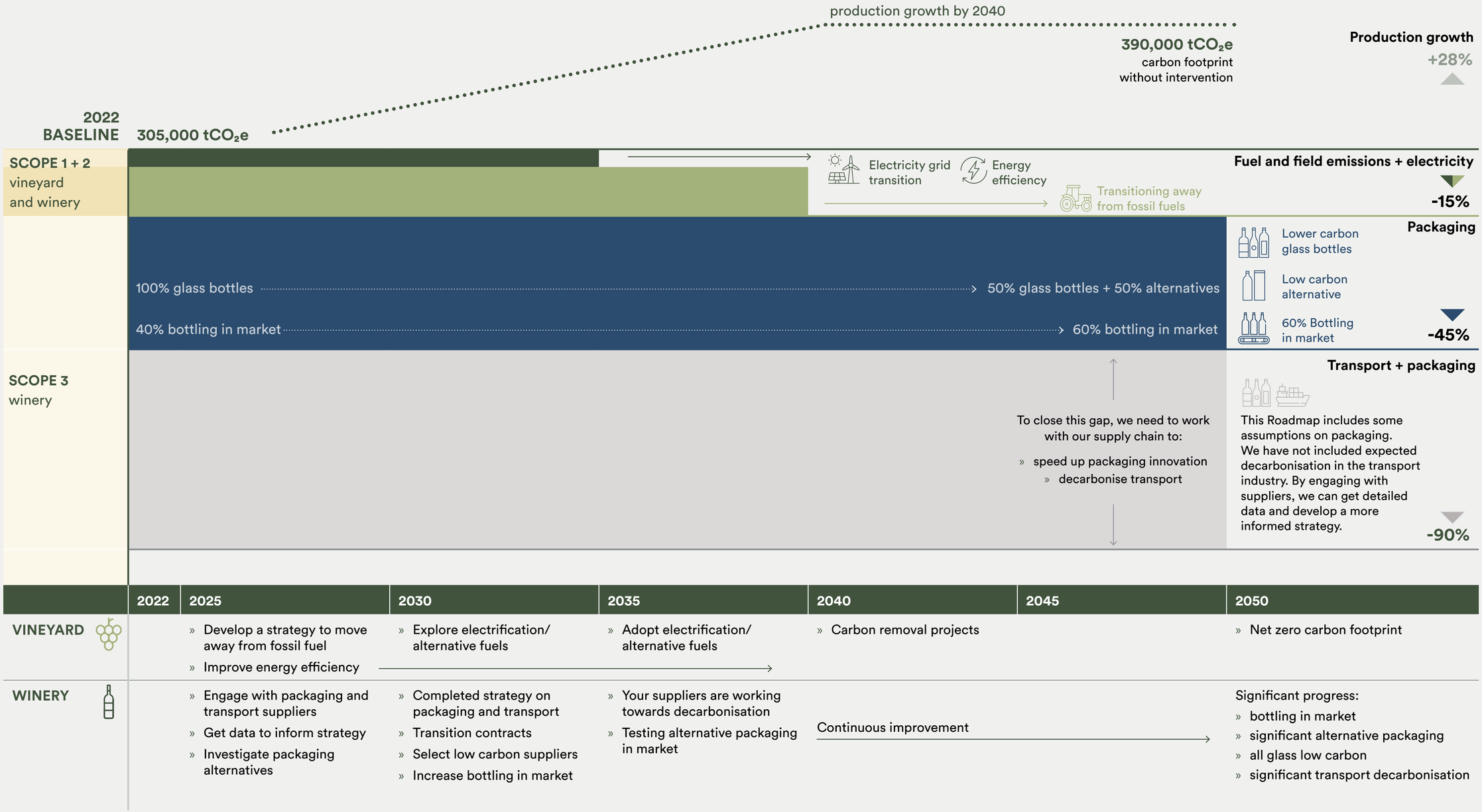
Decarbonising strategies are in action
Target: At least 12% emissions reduction (36,000 tCO_2e), with a 50% reduction in Scope 1 emissions and net zero Scope 2 emissions.

WHO	OPPORTUNITY	LIST OF POTENTIAL ACTIONS
	Divest from fossil fuels	» Start moving away from fossil fuels » Invest in the necessary capital goods and infrastructure
	Improve energy efficiency	» Implement long-term efficiency scheme
	Carbon removals	» Carry out research for carbon removals » Develop and implement strategy for carbon removals
	Decarbonise packaging	» Procure lightweight and low-carbon glass » Increase bottling in market » Test alternate packaging materials

BY 2050

Go further in your decarbonising effort
Target: About 80% reduction of Scope 1 emissions, 100% decarbonisation of Scope 2 emissions and at least 35% reduction of Scope 3 emissions (136,000 tCO_2e).

WHO	OPPORTUNITY	LIST OF POTENTIAL ACTIONS
	Fully divest from fossil fuels	» Ensure all operations requiring energy are either electrified or supported by green hydrogen
	Maximise energy efficiency	» Drive down energy consumption
	Start removing carbon	» Establish projects on-site and/or invest in projects off-site to remove carbon
	Procure net-zero aligned packaging	» Procure packaging materials with the lowest possible carbon intensity i.e., start removing carbon



	2022	2025	2030	2035	2040	2045	2050
VINEYARD		» Develop a strategy to move away from fossil fuel » Improve energy efficiency	» Explore electrification/ alternative fuels	» Adopt electrification/ alternative fuels	» Carbon removal projects		» Net zero carbon footprint
WINERY		» Engage with packaging and transport suppliers » Get data to inform strategy » Investigate packaging alternatives	» Completed strategy on packaging and transport » Transition contracts » Select low carbon suppliers » Increase bottling in market	» Your suppliers are working towards decarbonisation » Testing alternative packaging in market	Continuous improvement		Significant progress: » bottling in market » significant alternative packaging » all glass low carbon » significant transport decarbonisation

Your unique blend of decarbonisation

THE ROADMAP HAS BEEN CREATED BASED ON THE FOLLOWING ASSUMPTIONS:

BY 2030	BY 2040	BY 2050
» 10% improvement in fuel efficiency and electricity efficiency » 5% of on-site fuel demand is met with biofuel (specifically used cooking oil) » 5% of on-site fuel demand is met by electrifying activities and using electricity » 95% of the national electricity grid is sourced from renewable energy » 5% of electricity demand is sourced from purchased Renewable Energy Certificates » 25% of packaging is heavyweight glass bottles » 75% of packaging is lightweight glass bottles » 50% of wine is bottled in market » Vineyards and wineries have set plans to divest from fossil fuels » Wineries have engaged with packaging suppliers to set emission reduction targets » Wineries have engaged with transport suppliers to explore efficiency improvements » 12% industry growth from 2022-2030 » The industry has a complete emissions footprint.	» 20% improvement in fuel efficiency and electricity efficiency from 2022 » 15% of energy demand from fuels is met by green hydrogen » 25% of energy demand from fuels has been electrified » 10% of energy demand from fuels is met with biofuel (specifically used cooking oil) » 28% industry growth from 2022-2040 » 100% renewable national electricity grid » 25% of packaging is heavyweight glass bottles » 50% of packaging is lightweight glass bottles » 25% of packaging is paper bottles (beverage cartons) » 55% of wine is bottled in market.	» 30% improvement in fuel efficiency and electricity efficiency from 2022 » 5% of fuel demand is met with biofuel (specifically used cooking oil) » 50% of fuel demand has been electrified » 45% of fuel demand is met with green hydrogen » 25% of packaging is heavyweight glass bottles » 25% of packaging is lightweight glass bottles » 50% of packaging is paper bottles (beverage cartons) » 50% reduction in the carbon intensity of glass » 60% of wine is bottled in market.

YOUR UNIQUE BLEND OF DECARBONISATION

Not everyone is starting from the same place. Reducing the emissions of New Zealand's wine industry is not going to be a linear process. It's likely a series of steps assisted by new technologies, changes to market preferences and progress in other industries (e.g. decarbonisation of the grid, transport, etc.).

Ultimately, you can choose to adopt different strategies to reduce your emission at different rates based on what is pragmatic and suitable for your individual case. The faster incremental actions are pursued, the more flexibility there is in how to evolve progress to net zero over time.

You can adopt a blend of emission reduction opportunities that suit your organisation's capabilities and ambitions. The number of 'varieties' or opportunities which go into a bottle of wine can also evolve over time.

ENERGY AND FUELS
- electrification
- bio fuels
- green hydrogen
- energy efficiency

PACKAGING
- low carbon glass
- alternative packaging materials
- lightweight glass

TRANSPORT
- freight efficiency
- bottling in market
- low carbon freight solutions and fuels

Moving faster together

MOVING FASTER TOGETHER

This Roadmap shows that our sector can reduce our Scope 1 GHG emissions by up to 75% from 2022 levels by 2050, Scope 2 GHG emissions by up to 100% by 2050, and Scope 3 emissions by approximately 35%.

Emissions from fertilisers and waste in vineyards and supply chain emissions from wineries – particularly packaging and transport – will be hardest to tackle. Achieving a reduction in packaging and transport emissions beyond the 35% presented in this Roadmap will require significant engagement with suppliers.

This will be a challenging process, but there will also be opportunities for our industry as we develop new ways of doing what we're doing best: growing grapes and producing our world-famous wines.

We are already seeing the effects of a changing climate. The Roadmap is a stark reminder that we need to collectively speed up our actions, make changes now and improve how we measure our emissions. Mitigating climate change and being able to communicate our efforts will become increasingly important for market access and our reputation.

Good first steps for businesses that are getting started with their emission reduction journey are assessing and auditing their own emissions and creating a roadmap for their actions.

Let's work together. Only collective engagement of New Zealand's winegrowing industry will achieve the change we need for a productive future. Wherever you begin in your business, there is no time like the present to start your journey to net zero!

RECOMMENDATIONS FOR COLLECTIVE ENGAGEMENT

- Improve SWNZ data collection for packaging and transport
- Investigate alternative packaging materials and test market acceptance
- Evaluate the feasibility of electrification, green hydrogen and on-site solar energy generation
- Engage as an industry to complete a supplier-specific comparative LCA of wine
- Work with freight operators to decarbonise transport
- Reduce emissions from fertilisers and waste

DISCLAIMER

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This Roadmap is intended to provide businesses with a greater understanding of the challenges facing the industry from climate change and sets out a series of possible tools and opportunities to mitigate those challenges. Opinions and judgments expressed in the document are based on our understanding of the carbon footprint of the wine industry and the regulatory landscape at the time. Opinions and judgements expressed herein do not constitute legal advice. Ultimately, it is up to individual businesses to decide what (if any) strategies to implement to suit individual business needs.

version 1.0

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