



“Carbon Neutral Project”

King Country
River Care

7/17/2024



Project Background

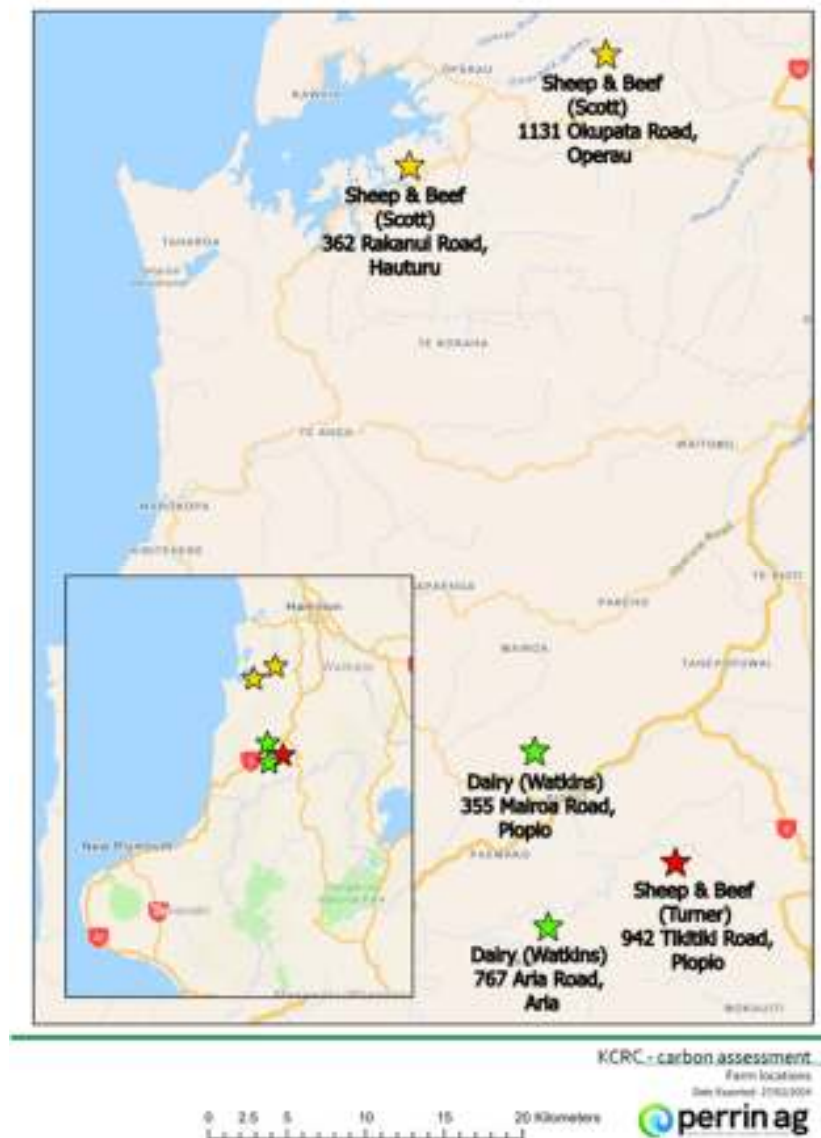
From KCRC:

- “It would be a positive thing to be able to show farmers what ‘carbon neutral’ looks like”.
- Use three real farmers in our area to investigate:
 - Where they are now.
 - Will any policy changes, they are thinking about, get them to a carbon neutral position?
 - If relevant what else might need to be considered?
- But first what is “carbon neutral”? Seem to read about various people/operations and organizations being carbon neutral! What do they mean when they say this?
- And whose rules are these anyway?



Our three farmers

- Location within KCRC area.
- Dairy and sheep/beef.
- Breeding cows.
- Hill country.
- Our next generation.





The Government vs The Market

- Lots of discussion after the last two elections about the rules and just last week:
 - *“Later this month, we will introduce legislation amending the Climate Change Response Act 2002 (the CCRA) to ensure agriculture does not enter the NZ ETS”.*
 - *“It’s time for a fresh start on how we engage with farmers and processors to work on biogenic methane”.*
- What does all this mean – has this issue gone away? We still have:
 - Climate Change Response (Zero Carbon) Amendment Act 2019;
 - Large concern about rising global temperatures; and
 - Our key agricultural customers and capital providers requiring change as part of doing business.
- Example of lower interest rate sustainability loan documentation:
 - *“The farm must calculate an annual greenhouse gas emissions profile using an approved greenhouse gas calculator as part of the FEP.”*
 - *“The farm must have an emissions reduction plan which shall include actions, timeframes, and responsible persons.”*



The “Zero Carbon Act”

- Greenhouse gas **emissions reduction target for New Zealand** to:
 - Reduce **net emissions** of all greenhouse gases (except biogenic methane) to zero by 2050; and
 - Reduce emissions of biogenic methane to 24% to 47% below 2017 levels by 2050, including to 10% below 2017 levels by 2030.
- It also **requires the Government** to take action and to (have) established the Climate Change Commission to provide expert advice and monitoring to help keep successive governments on track to meeting long term goals.
- The setting of two separate targets has become known as **the “split-gas” approach**.
- The targets of the Zero Carbon Act will be calculated at a **NZ level** for the net emissions to be zero and at an **agriculture sector level** for biogenic methane.
- For this **farm-level project** we have used the parameters of the Zero Carbon Act as a driver of our project methodology and results reference point.
- As individual businesses we are not being asked to meet these targets, but we are part of the “NZ” and “ag-sector” communities.



Split Gas

- Effectively considers greenhouse gas emissions as **“long-lived gases”** (plus any methane from the fossil fuel industry or other small sources) and **“biogenic methane”**.
- For NZ agriculture the long-lived gases of interest are:
 - Carbon dioxide – fossil fuels, cropping, lime.
 - Nitrous oxide – dung and urine patches from animals and from the use of nitrogenous fertilizers.
- For NZ agriculture the level of methane emissions are dependent on:
 - The number of animals on the farm;
 - How much feed they are eating – pasture and bought in supplements; and
 - How many grams of methane is produced per kgDM consumed (21.6 g methane/kgDM).
- It is this last point that is being worked on by:
 - Breeders and geneticists to produce stock that will eat and perform at least the same as usual but have a lower methane conversion rate; and
 - Scientists and entrepreneurs to produce a vaccine and an inhibitor so treated animals have a lower methane conversion rate.



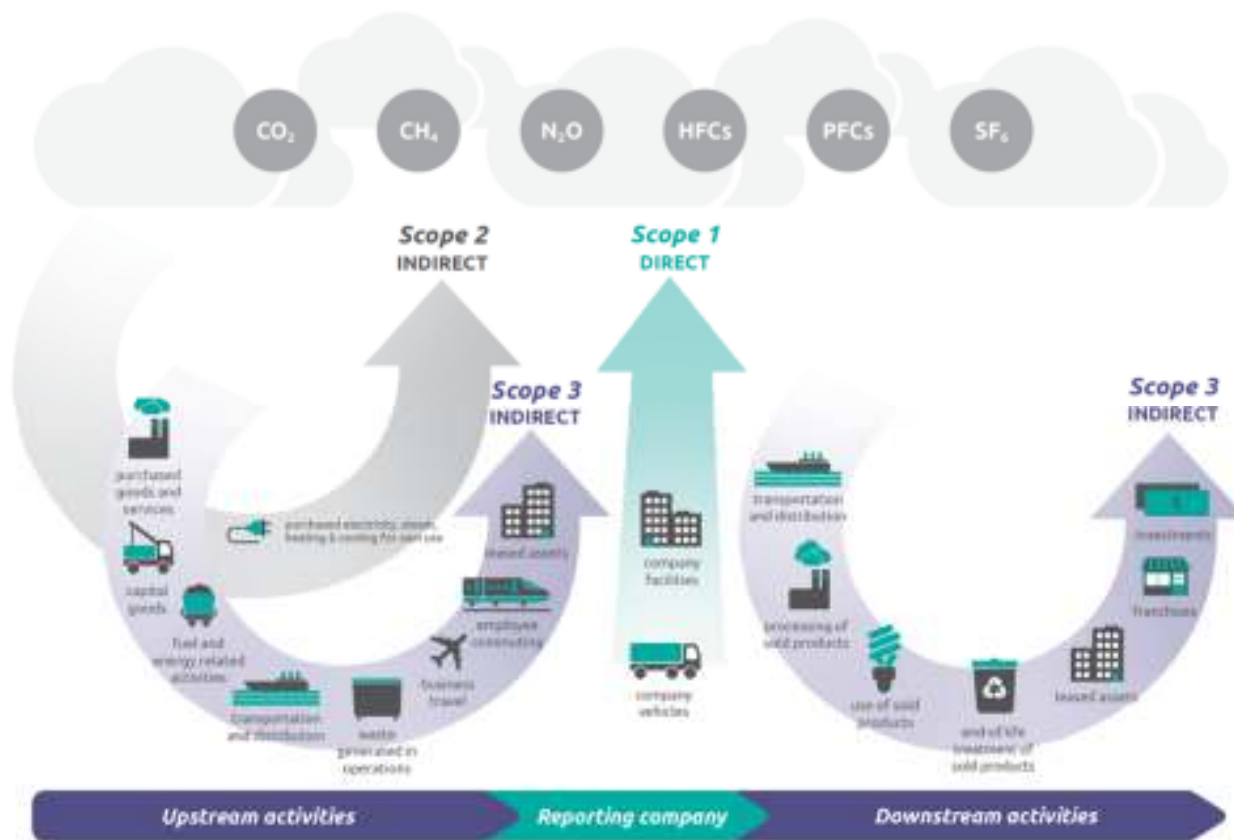
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- What does all this mean – has this issue gone away? We still have:
 - Climate Change Response (Zero Carbon) Amendment Act 2019;
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 - **Our key agricultural customers and capital providers requiring change as part of doing business. WHY?**
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And Scope 1, Scope 2, and Scope 3

Overview of GHG Protocol scopes and emissions across the value chain

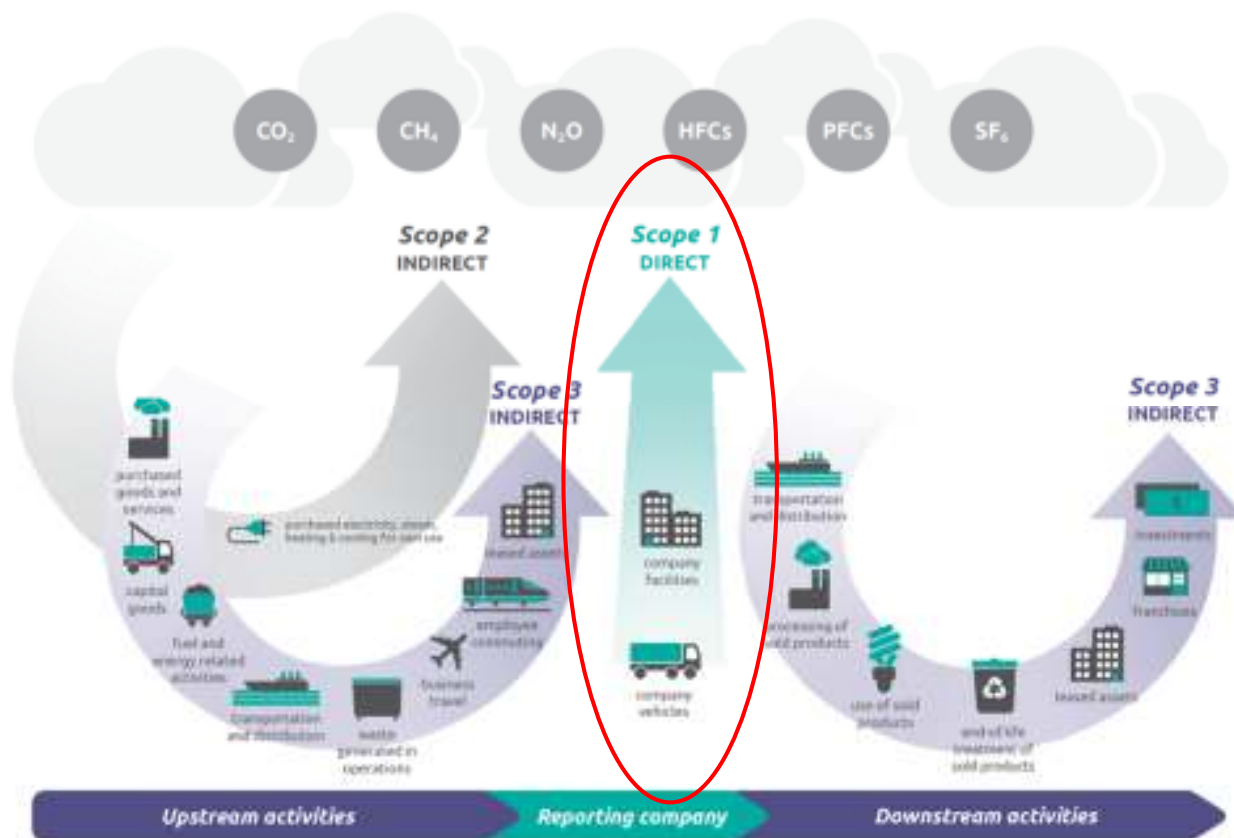


Source: [WRI/WBCSD Corporate Value Chain \(Scope 3\) Accounting and Reporting Standard \(PDF\)](#), page 5.



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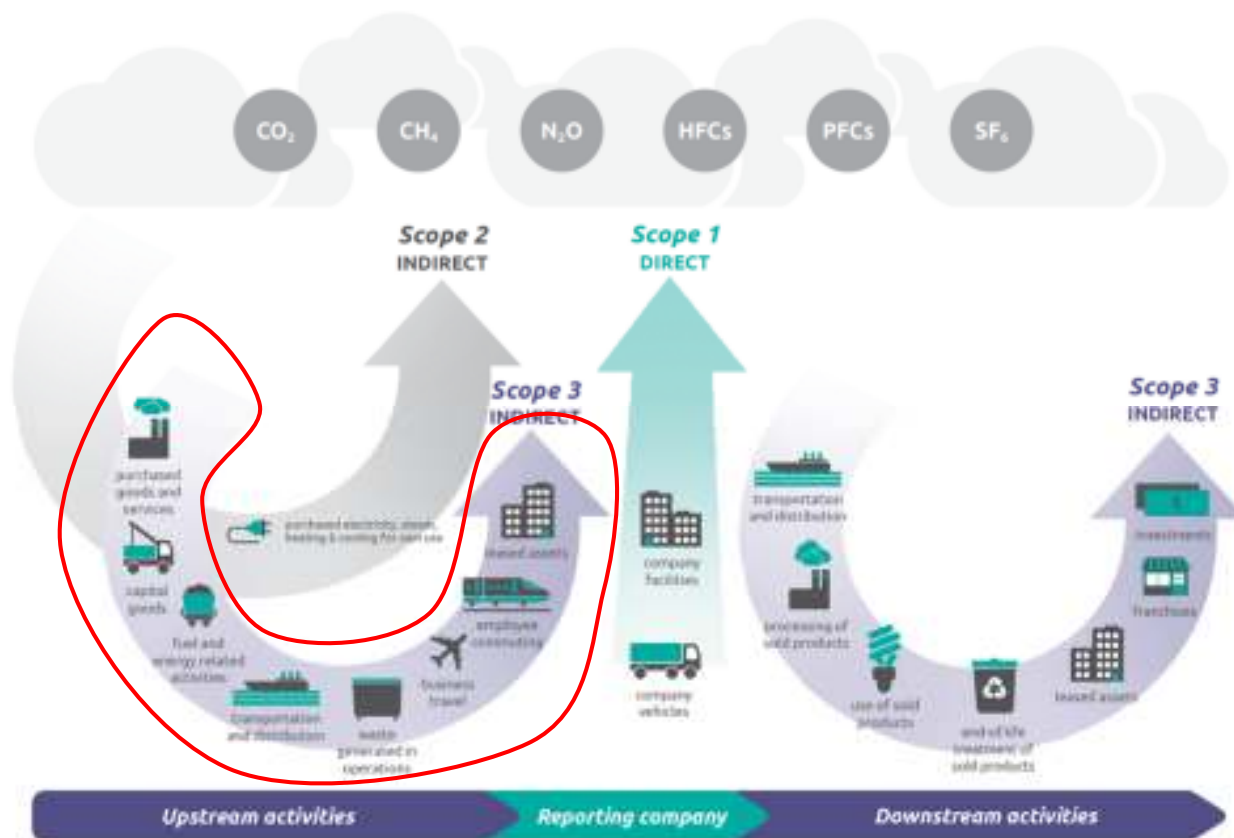


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Sequestration

- “Net emissions” – the difference between what is emitted and what is sequestered.
- Trees:
 - Different rates for different types.
 - Changing information – historical information, theoretical versus actual, <100 ha versus >100 ha.
 - Depends on the age of the tree – so sequestration is different for each year!
- How did we handle this in our project?
 - Made some assumptions!
 - Old bush – zero sequestration. Right or wrong?
 - New pine trees planted into pasture have a “risk free” 16-year period of sequestration. Based on the MPI Carbon Look-up Tables for Forestry the **average annual rate** of sequestration for the first 16 years has been used:
 - Indigenous forest @ 6.8 tonnes of CO₂-e/ha/yr
 - Pinus radiata @ 22.1 tonnes CO₂-e/ha/yr
 - Douglas-fir @ 12.1 tonnes CO₂-e/ha/yr
 - Exotic softwood (e.g. Redwood) @ 11.3 tonnes CO₂-e/ha/yr
 - Exotic hard-wood @ 27.2 tonnes CO₂-e/ha/yr



Mitigation

- Report of the Biological Emissions Reference Group (BERG).
- Published report in December 2018.
- Considered a significant amount of background work – including current and future mitigation options.
- Future options included:
 - Methane inhibitors;
 - Methane vaccine;
 - Breeding low emission animals; and
 - Low emission feeds.
- They rated these in terms of confidence in availability and their reduction % potential for both 2030 and 2050.
- Have used their information when considering how our project farmers might reduce methane emissions:
 - Genetics – based on 5% reduction for sheep and dairy in 2030 (10% in 2050 and 5% for beef); and
 - Vaccines and inhibitors – based on 10% in 2030 (and 30% in 2050).



So - how did we do this project

- Modelled a status quo base farm system that reflects the current operation:
 - Block measurement on Overseer.
 - Livestock system on Farmax – used for making sure alternative systems are comparative to the base system and to compare profitability. We used Farmax “pricing of the day” for income and operating expenditure.
 - Inputted the farming system from Farmax into Overseer to calculate biogenic methane emissions as well as the long-lived greenhouse gas emissions (from the one model) – Scope 1 and Scope 2 only.
- Then modelled changes the farmer was considering – generally involved:
 - Extra planting – generally smaller changes;
 - Changes to stock performance and numbers – small to medium changes; and a
 - “Bigger” changes of the above.
- Outside these models, calculations were completed for sequestration by vegetation type and the impact of two key future methane emission mitigation options – genetics and a methane vaccine or inhibitor.



What can be taken from this project and discussion?

- A greater understanding of what might be meant when someone says they are “carbon neutral”.
- What type of implications there might be for you are when someone suggests you should/can be carbon neutral.
- When the industry is discussing this with the government you are in a better position to provide feedback.
- What would be some useful to-do projects “now”:
 - Data collection – what do you collect using your current “decision-making support tools” and how does this compare to what you might need going forward?
 - Understand what vegetation type and areas you have on your property, and will it count for being carbon neutral?
 - Some learning about the emission calculators that are out there – what might you use, who will do it, and is it acceptable for the organization you are completing the calculations for?
- Being more aware of what is being asked by your bank or processor when they ask you for your carbon or methane reduction plan?



Next parts of today

1. Phil Watkins/Brent Scott/Stephan Turner – what does his farm operation involve.
2. The specifics of their modelling and what were the results.
3. A Fonterra/Greenlea/Silver Fern Farm industry perspective.

For helping to provide context for these next sections – “spoiler alert”:

1. A on-farm net carbon zero (excluding biogenic methane) position would appear doable.
2. Reducing our emissions intensity should also be doable.
3. Achieving a 10% reduction in total methane emissions by 2030 will be a significant challenge to achieve as an individual – either involving significant on-farm change or the availability of new technology and new genetics.
4. Achieving a 24% to 47% reduction in total methane emissions by 2050 will be a huge challenge – it will rely on the availability of new technology and new genetics.



Thank you to ...

- Our three project farming families – Watkins, Scott and Turner.
- Project and field-day sponsors:

Ministry for Primary Industries
Manatū Ahu Matua



7/17/2024



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