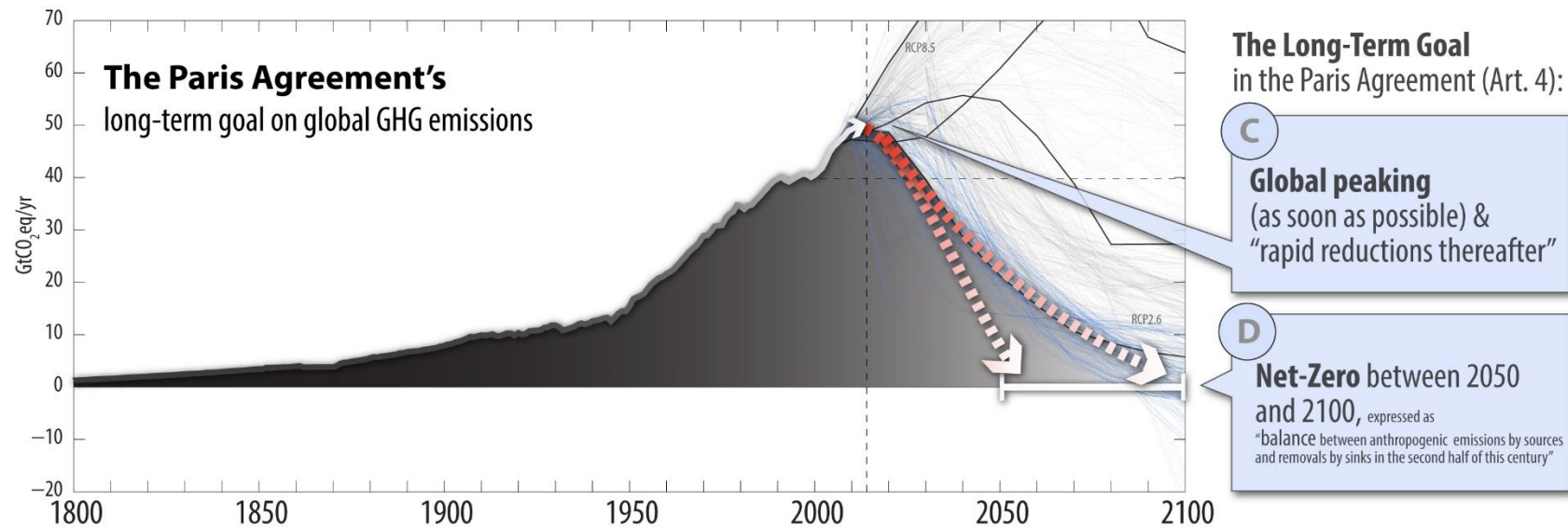


~~Carbon neutral~~ or low emissions livestock production

Richard Eckard



- Reach global peaking GHG emissions as soon as possible
 - Achieve a balance between anthropogenic emissions by sources and removals by 2050
 - COP26 - Increased 2030 ambition

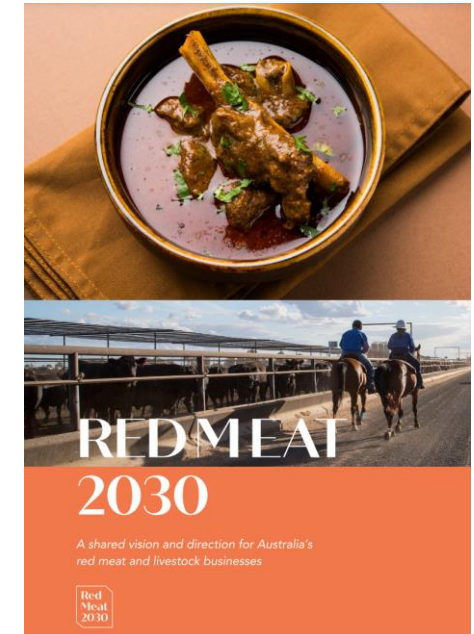
To meet 1.5 °C, methane must reduce by

- 11-30% by 2030
- 24-47% by 2050

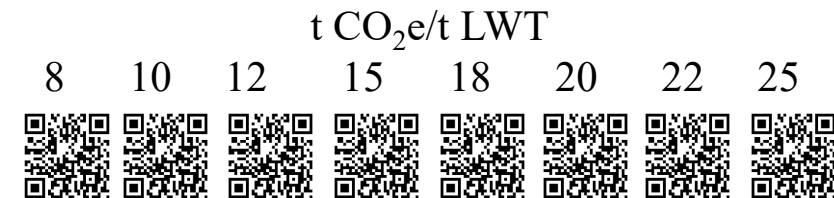
(Arndt et al. 2022)

- Fonterra
 - Climate-neutral growth to 2030 for pre-farmgate emissions from a 2015 base year
 - Unilever **
 - Reducing the GHG impact of their products by 50% by 2030, compared to baseline of 2010
 - Mondelez
 - Reduce absolute GHG from manufacturing 15%
 - 100% renewable energy
 - Nestle **
 - Zero environmental impact in our operations
 - JBS
 - Net-zero GHG by 2040 and zero deforestation across its global supply chain by 2035
 - Heineken
 - Carbon neutral barley-malt supply chain
 - Rabobank & NAB
 - Net zero financed emissions by 2050
 - Hold 50% of Australia agri-debt market
 - Mars
 - Reduce GHG across our value chain 27% by 2025 and 67% by 2050 (from 2015 levels)
 - Kellogg Company **
 - 65% reduction by 2050
 - 100% renewable energy
 - Pfizer
 - 60 to 80% by 2050
 - Wilmar international
 - 89.72% less GHG from 2013 to 2020
 - 100% renewable energy
 - Olam
 - Reduce GHGs by 50% by 2030 both in our own operations and in our supply chain
 - By 2050, we aspire to be carbon positive in operations, requiring a 5% emissions reduction per year from 2031 – 2050
 - Cargil
 - Reduce our global supply chain emissions 30% by 2030 and net zero by 2050
- **committed to increasing plant-based protein
-
- Of the 100 largest economies 69 are companies and 31 are countries
 - **70% of Australian farm produce is exported**

- Australian Red Meat Industry (RMAC 2030 strategy)
 - *Australian red-meat can be carbon (climate?) neutral by 2030 (CN30)*
- Mato Grosso do Sul, “MS carbon neutral” initiative
- New Zealand
 - Net zero by 2050
 - Non-zero methane target
 - Up to 47% by 2050
 - All farms required to complete a carbon audit by 2022
 - Research levy on methane
- California SB 32
 - 40 % less methane by 2030 over 1990
- Global Methane Pledge at COP26
 - 30% less methane by 2030 by 105 countries (plus Australia)



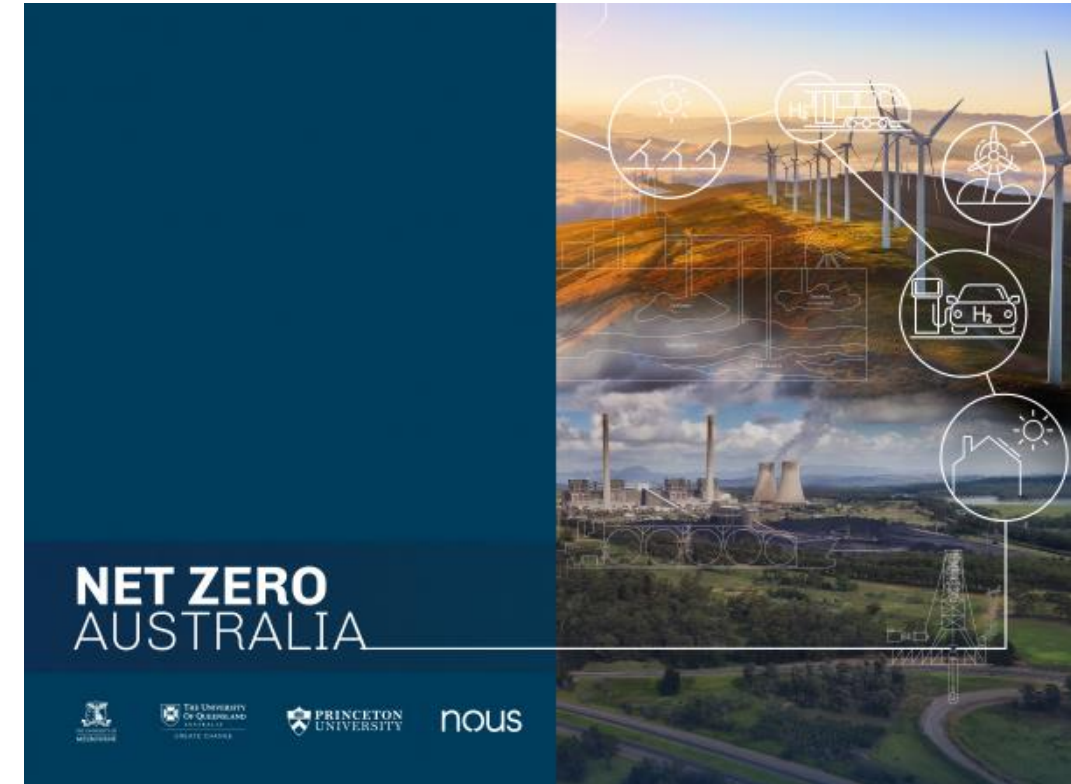
- Supply chains will need to meet their targets
- All suppliers will conduct GHG audit
 - Data sent to supply chain buyer
- Purchaser starts buying at lowest GHG intensity
 - The higher GHG they purchase costs them more carbon offsets



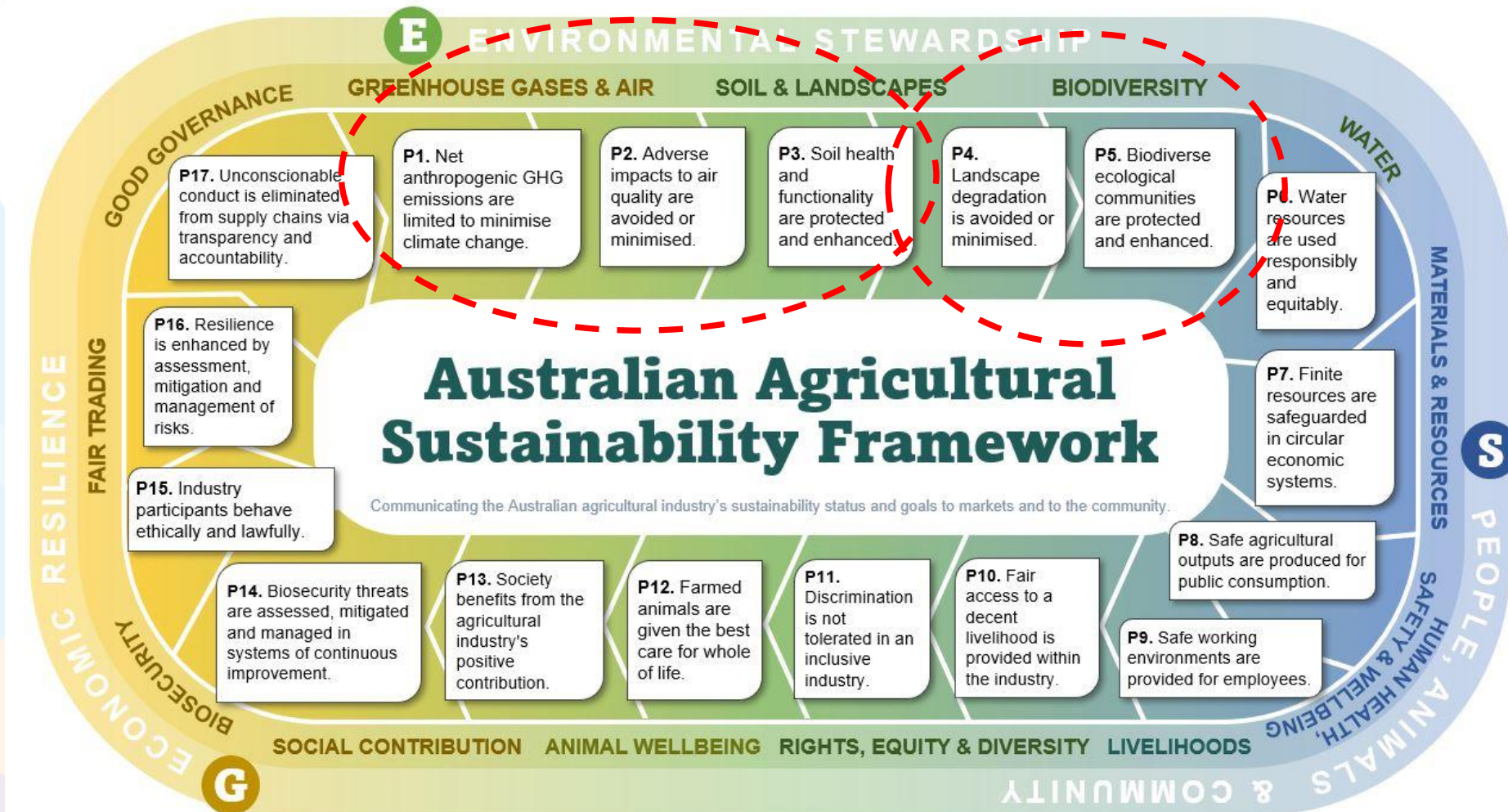
Order-Coordinator Accounting Tool						Period: 1/1/2020-31/12/2020	
Order	Weight (t CO2e/t LWT)	Weight (t CO2e/t LWT)	Weight (t CO2e/t LWT)	Weight (t CO2e/t LWT)	Weight (t CO2e/t LWT)	Weight (t CO2e/t LWT)	Weight (t CO2e/t LWT)
Supplier 1 Data							
Order 1	100	100	100	100	100	100	100
Order 2	200	200	200	200	200	200	200
Order 3	300	300	300	300	300	300	300
Order 4	400	400	400	400	400	400	400
Order 5	500	500	500	500	500	500	500
Order 6	600	600	600	600	600	600	600
Order 7	700	700	700	700	700	700	700
Order 8	800	800	800	800	800	800	800
Order 9	900	900	900	900	900	900	900
Order 10	1000	1000	1000	1000	1000	1000	1000
Order 11	1100	1100	1100	1100	1100	1100	1100
Order 12	1200	1200	1200	1200	1200	1200	1200
Order 13	1300	1300	1300	1300	1300	1300	1300
Order 14	1400	1400	1400	1400	1400	1400	1400
Order 15	1500	1500	1500	1500	1500	1500	1500
Order 16	1600	1600	1600	1600	1600	1600	1600
Order 17	1700	1700	1700	1700	1700	1700	1700
Order 18	1800	1800	1800	1800	1800	1800	1800
Order 19	1900	1900	1900	1900	1900	1900	1900
Order 20	2000	2000	2000	2000	2000	2000	2000
Order 21	2100	2100	2100	2100	2100	2100	2100
Order 22	2200	2200	2200	2200	2200	2200	2200
Order 23	2300	2300	2300	2300	2300	2300	2300
Order 24	2400	2400	2400	2400	2400	2400	2400
Order 25	2500	2500	2500	2500	2500	2500	2500
Order 26	2600	2600	2600	2600	2600	2600	2600
Order 27	2700	2700	2700	2700	2700	2700	2700
Order 28	2800	2800	2800	2800	2800	2800	2800
Order 29	2900	2900	2900	2900	2900	2900	2900
Order 30	3000	3000	3000	3000	3000	3000	3000
Order 31	3100	3100	3100	3100	3100	3100	3100
Order 32	3200	3200	3200	3200	3200	3200	3200
Order 33	3300	3300	3300	3300	3300	3300	3300
Order 34	3400	3400	3400	3400	3400	3400	3400
Order 35	3500	3500	3500	3500	3500	3500	3500
Order 36	3600	3600	3600	3600	3600	3600	3600
Order 37	3700	3700	3700	3700	3700	3700	3700
Order 38	3800	3800	3800	3800	3800	3800	3800
Order 39	3900	3900	3900	3900	3900	3900	3900
Order 40	4000	4000	4000	4000	4000	4000	4000
Order 41	4100	4100	4100	4100	4100	4100	4100
Order 42	4200	4200	4200	4200	4200	4200	4200
Order 43	4300	4300	4300	4300	4300	4300	4300
Order 44	4400	4400	4400	4400	4400	4400	4400
Order 45	4500	4500	4500	4500	4500	4500	4500
Order 46	4600	4600	4600	4600	4600	4600	4600
Order 47	4700	4700	4700	4700	4700	4700	4700
Order 48	4800	4800	4800	4800	4800	4800	4800
Order 49	4900	4900	4900	4900	4900	4900	4900
Order 50	5000	5000	5000	5000	5000	5000	5000
Order 51	5100	5100	5100	5100	5100	5100	5100
Order 52	5200	5200	5200	5200	5200	5200	5200
Order 53	5300	5300	5300	5300	5300	5300	5300
Order 54	5400	5400	5400	5400	5400	5400	5400
Order 55	5500	5500	5500	5500	5500	5500	5500
Order 56	5600	5600	5600	5600	5600	5600	5600
Order 57	5700	5700	5700	5700	5700	5700	5700
Order 58	5800	5800	5800	5800	5800	5800	5800
Order 59	5900	5900	5900	5900	5900	5900	5900
Order 60	6000	6000	6000	6000	6000	6000	6000
Order 61	6100	6100	6100	6100	6100	6100	6100
Order 62	6200	6200	6200	6200	6200	6200	6200
Order 63	6300	6300	6300	6300	6300	6300	6300
Order 64	6400	6400	6400	6400	6400	6400	6400
Order 65	6500	6500	6500	6500	6500	6500	6500
Order 66	6600	6600	6600	6600	6600	6600	6600
Order 67	6700	6700	6700	6700	6700	6700	6700
Order 68	6800	6800	6800	6800	6800	6800	6800
Order 69	6900	6900	6900	6900	6900	6900	6900
Order 70	7000	7000	7000	7000	7000	7000	7000
Order 71	7100	7100	7100	7100	7100	7100	7100
Order 72	7200	7200	7200	7200	7200	7200	7200
Order 73	7300	7300	7300	7300	7300	7300	7300
Order 74	7400	7400	7400	7400	7400	7400	7400
Order 75	7500	7500	7500	7500	7500	7500	7500
Order 76	7600	7600	7600	7600	7600	7600	7600
Order 77	7700	7700	7700	7700	7700	7700	7700
Order 78	7800	7800	7800	7800	7800	7800	7800
Order 79	7900	7900	7900	7900	7900	7900	7900
Order 80	8000	8000	8000	8000	8000	8000	8000
Order 81	8100	8100	8100	8100	8100	8100	8100
Order 82	8200	8200	8200	8200	8200	8200	8200
Order 83	8300	8300	8300	8300	8300	8300	8300
Order 84	8400	8400	8400	8400	8400	8400	8400
Order 85	8500	8500	8500	8500	8500	8500	8500
Order 86	8600	8600	8600	8600	8600	8600	8600
Order 87	8700	8700	8700	8700	8700	8700	8700
Order 88	8800	8800	8800	8800	8800	8800	8800
Order 89	8900	8900	8900	8900	8900	8900	8900
Order 90	9000	9000	9000	9000	9000	9000	9000
Order 91	9100	9100	9100	9100	9100	9100	9100
Order 92	9200	9200	9200	9200	9200	9200	9200
Order 93	9300	9300	9300	9300	9300	9300	9300
Order 94	9400	9400	9400	9400	9400	9400	9400
Order 95	9500	9500	9500	9500	9500	9500	9500
Order 96	9600	9600	9600	9600	9600	9600	9600
Order 97	9700	9700	9700	9700	9700	9700	9700
Order 98	9800	9800	9800	9800	9800	9800	9800
Order 99	9900	9900	9900	9900	9900	9900	9900
Order 100	10000	10000	10000	10000	10000	10000	10000



- Agriculture will need to **inset** ALL their own soil and tree carbon
 - Maintain supply chain access post 2030
- There are no surplus offsets in agriculture!

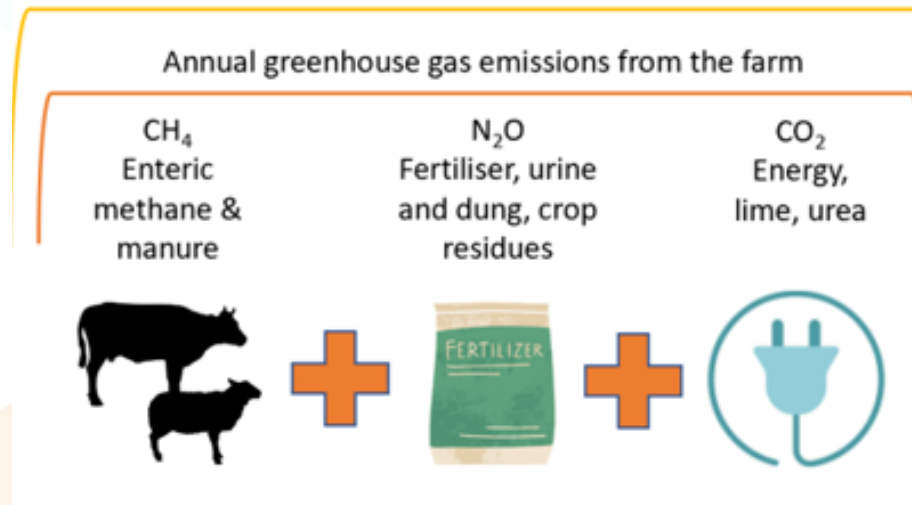


- To 2030
 - Access to premium markets
 - e.g. carbon neutral wool
- Post 2030
 - Future compliance with supply chain targets
 - **Insetting** not offsetting
 - Carbon credits only allowed in
 - “hard to abate” sectors
- Fundamental difference between
 - Carbon sequestration offset
 - Finite accumulating stock
 - Will need these stocks as an INSET
 - Emissions avoidance offset = flux
 - Could sell these up to the day neutrality is required



Carbon Accounting: The concept

On farm emissions sources (Scope 1 and 2)



- Chicken meat
 - 3 to 5 kg CO₂e/kg LWT
- Pigs
 - 4 to 7 kg CO₂e/kg LWT
- Cropping
 - 0.10 to 0.75 kg CO₂e/kg grain
 - 0.18 - 0.25 t CO₂e/ cotton bale (?)
- Dairy
 - 8 to 21 t CO₂e/t MS
- Beef
 - 11 to 18 kg CO₂e/kg LWT
- Sheep
 - 6 to 8 kg CO₂e/kg LWT
- Wool
 - 21 to 28 kg CO₂e/kg wool
- Wine
 - 0.6 to 4.7 kg CO₂e/L
- Pigs and poultry
 - Manure management
 - Renewable energy
- Dairy and feedlots
 - 50% is possible
- Extensive grazing
 - 10-20% may be possible
- Wine & perennial hort
 - 100% achievable
- Annual cropping
 - 50% is possible

- Know your baseline
 - A basic farm carbon audit (*or at least know what data to keep*)
 - Supply chain targets are **NOT** requiring your farm to be **zero by** 2030
- Plan the first steps
 - Start with the 'Do-now' / no-regrets strategies
- Carbon credits trading vs low carbon (cannot do not both!!)
 - Get independent advice
 - You may need to **INSET** all your carbon access your supply chain after 2030!

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piccc.org.au/education/carbonneutraltraining