

McWilliams Wines Limited
Environmental Assessment Application
Winery Expansion and Packaging Project
Greenhouse Gas Emissions Calculations (Annual Basis)

	Crush volume	34,000	65,000	tonne
	Current		Proposed	
1 FUEL COMBUSTION				
Scope 1 - Consumption of Natural gas delivered in a pipeline				
Q = Quantity of Natural Gas consumed	5,642	1	9,431	5 GJ
EF(CO ₂)	51.2		51.2	kg CO ₂ e/GJ
EF(CH ₄)	0.1		0.1	kg CO ₂ e/GJ
EF(N ₂ O)	0.03		0.03	kg CO ₂ e/GJ
GHG Emissions = Q x EF/1,000	290		484	t CO₂e
Scope 3 - Extraction and distribution of natural gas delivered in a pipeline				
Q = Quantity of Natural Gas consumed	5,642		9,431	GJ
EF(CO ₂)	15.7		15.7	kg CO ₂ e/GJ
GHG Emissions = Q x EF/1,000	89		148	t CO₂e
Scope 1 - Mobile equipment - fuel quantity based (McWilliams owned vehicles)				
Q = Quantity of Diesel oil consumed	40	2	76	6 kL
EC = Energy content of fuel (Diesel)	38.6		38.6	GJ/kL
E = Energy value of fuel consumed	1544		2952	GJ
EF(CO ₂) = Emission Factor for general transport (Diesel Oil)	69.2		69.2	kg CO ₂ e/GJ
EF(CH ₄) = Emission Factor for general transport (Diesel Oil)	0.2		0.2	kg CO ₂ e/GJ
EF(N ₂ O) = Emission Factor for general transport (Diesel Oil)	0.5		0.5	kg CO ₂ e/GJ
GHG Emissions = Q x EF/1,000	108		206	t CO₂e
Scope 3 - Mobile equipment - fuel quantity based (McWilliams owned vehicles)				
Q = Quantity of Diesel oil consumed	40		76	kL
EC = Energy content of fuel (Diesel)	38.6		38.6	GJ/kL
E = Energy value of fuel consumed	1544		2952	GJ
EF(CO ₂) = Emission Factor for general transport (Diesel Oil)	5.3		5.3	kg CO ₂ e/GJ
GHG Emissions = Q x EF/1,000	8		16	t CO₂e
2 WASTE WATER TREATMENT				
Q = Quantity of waste water COD produced by operations	514	3	1,375	3 t COD
Fan = Proportion of wastewater treated anaerobically	0.2		0.8	
EF(CH ₄) = Emission factor for methane generated	0.25		0.25	t CH ₄ /t COD
R = Proportion of methane recovered	0		1	
GHG Emissions = Q x Fan x EF(CH₄) x (1-R) x 21	540		0	t CO₂e
3 PURCHASED POWER				
Scope 2 & 3 purchased electricity from NSW grid				
Qh = quantity of purchased power at Hanwood winery	4,084,080	1	10,231,680	5 kWhr
Qc = quantity of purchased power for bottling operations at Chullora	860,895	1	0	kWhr
EF = Emission factor for NSW power	1.07		1.07	kg CO ₂ e/kWhr
GHG Emissions = Q x EF/1,000	5,291		10,948	t CO₂e
4 TRANSPORT				
Scope 1 - Third party product delivery and distribution				
Q = quantity of kilometers travelled	4,916,324	4	9,871,288	4 km
FCR = Fuel consumption rate (heavy trucks, diesel)	54.6		54.6	L/100km
EC = Energy content of fuel (Diesel)	38.6		38.6	GJ/kL
E = Energy value of fuel consumed	103,614		208,043	GJ
EF(CO ₂) = Emission Factor for general transport (Diesel Oil)	69.2		69.2	kg CO ₂ e/GJ
EF(CH ₄) = Emission Factor for general transport (Diesel Oil)	0.2		0.2	kg CO ₂ e/GJ
EF(N ₂ O) = Emission Factor for general transport (Diesel Oil)	0.5		0.5	kg CO ₂ e/GJ
GHG Emissions = Q x EF/1,000	7,243		14,542	t CO₂e
Scope 3 - Third party product delivery and distribution				
Q = quantity of kilometers travelled	4,916,324	4	9,871,288	4 km
FCR = Fuel consumption rate (heavy trucks, diesel)	54.6		54.6	L/100km
EC = Energy content of fuel (Diesel)	38.6		38.6	GJ/kL
E = Energy value of fuel consumed	103,614		208,043	GJ
EF(CO ₂) = Emission Factor for general transport (Diesel Oil)	5.3		5.3	kg CO ₂ e/GJ
GHG Emissions = Q x EF/1,000	549		1,103	t CO₂e
Total GHG	14,117		27,447	t CO₂e
Litres produced	27,982,101		74,232,101	
	0.50		0.37	t CO ₂ e/kL wine

Notes:

- 1 From John Linney calculations (2010)
- 2 Estimate from 2010 actual \$
- 3 JJC Estimate used for design purposes
- 4 Steve's analysis
- 5 From John Linney calculations (Ultimate)
- 6 Factored up based on crush size