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Greenhouse Gas Accounting

Calculator Users Guide

Version 1.1

Developed by Provisor Pty Ltd and Yalumba Wines

Date: 1st February 2008
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Contents

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1 User Guidelines

This report is intended to provide the necessary information for a user to operate version 1.1 of the Wine Industry Greenhouse Gas Calculator. This report is not intended to completely detail all calculation methods and sources used in the development of this calculator. Users should refer to "Greenhouse Gas Accounting Protocol for the International Wine Industry" for more detail.

The calculator has been developed to incorporate all aspects of Greenhouse Gas emissions from the wine industry as identified by the Wine Industry Protocol. The calculator and Protocol are still considered to be in the 'development phase' and should be treated as an early version requiring future refinement. Specifically, place holder values have been used in areas where further research and understanding is needed.

Separate calculation pages have been included in version 1.1 for users to understand their AB32 emissions. These pages have been labelled with an 'R' prefix.

1.1 General Instructions to the Calculator

Cells shaded green are user entry cells. Users are able to enter numerical values or comments into these cells. Cells shaded pale pink are user choice cells. Users are requested to click on the cell and then select a choice from the drop down list. Within the calculation sheet all cells that are not user entry cells or user choice cells are protected to ensure that formulas and values are not accidentally changed or modified. Users who wish to understand the calculation methodology or emission factors are encouraged to consult the appropriate sections of the "Greenhouse Gas Accounting Protocol for the International Wine Industry".

The Excel tabs have been colour coded. Yellow indicates that the tabs are introductory and/or summary in nature, blue indicates that the calculations are part of Scope 1; red indicates the calculations are part of Scope 2 and Green indicates calculations are part of Scope 3.

It is intended that this version of the calculator will stimulate discussion in the following areas:

- Ease of use;
- Level of detail;
- Calculation complexity; and
- Inclusion / Exclusion of items.

All calculator pages have red movement buttons in the top right hand corner of the page. The buttons can be used to move 'forward' or 'backward' through the pages. Users are encouraged to use these 'forward' and 'backward' buttons to move through the calculator.

1.2 Calculation Requirements and Outcomes

The required outcomes of the calculator will be dependent upon the needs of the user. Generally, it is expected that three separate outcomes are likely to be sought via the use of this calculator. They are:

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- Understanding carbon footprinting based on the WRI's Scope 1 and 2;
- Understanding embodied carbon based on PAS 2050; and
- Understanding emissions based on the requirements of AB32.

It is expected that the Californian users will be particularly interested in understanding emissions based on the requirements of AB32, while Australian, New Zealand and South African users will be interested in carbon footprinting in line with WRI's scope 1 and 2.

The following flow charts are intended to guide users through the tool based upon their reporting (compulsory or voluntary) requirements.

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1.3 *Flow Chart AB32 Approach*

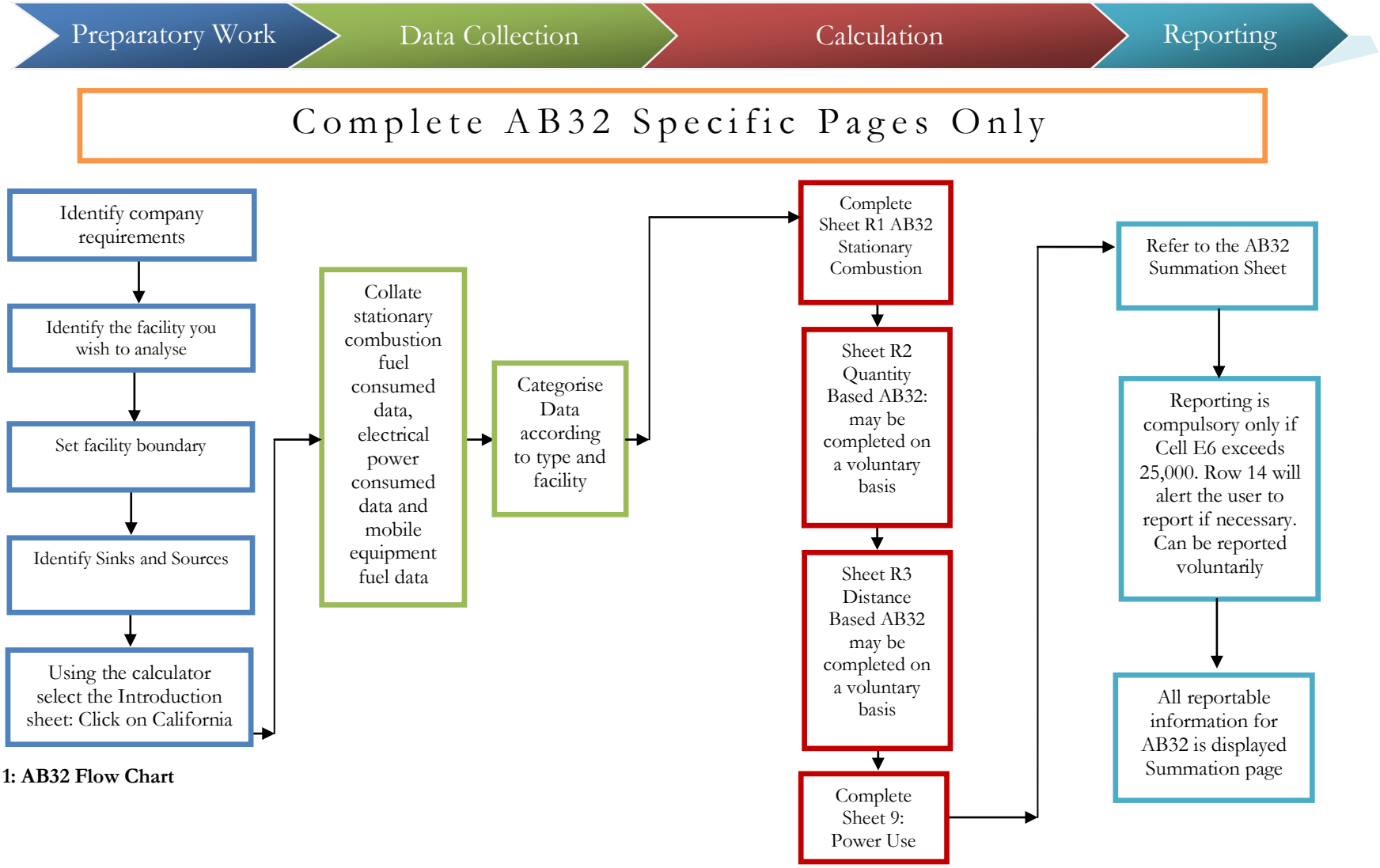

Figure 1: AB32 Flow Chart

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1.4 Flow Chart Embodied Carbon – PAS 2050 Approach

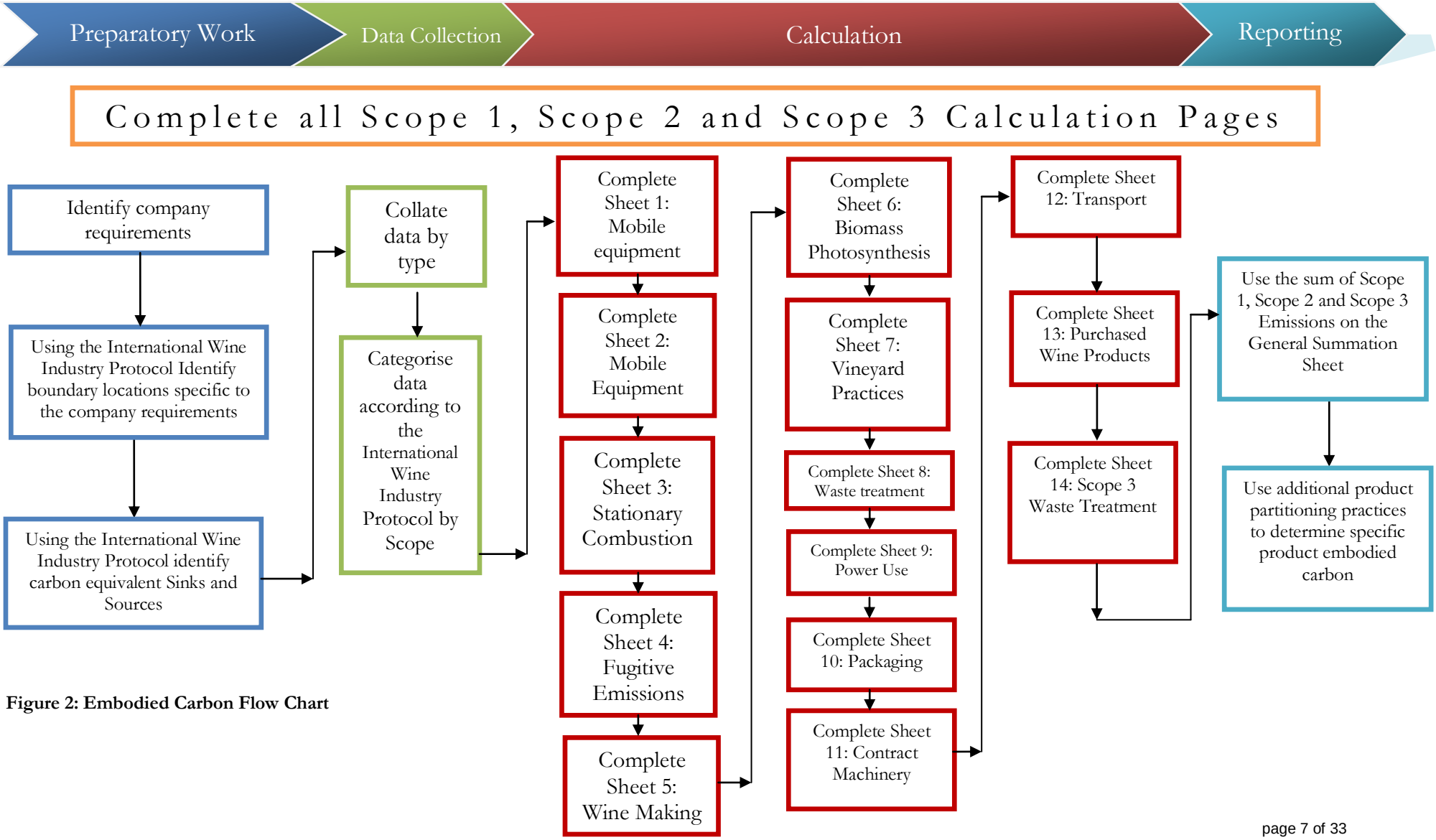

Figure 2: Embodied Carbon Flow Chart

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1.5 Flow Chart WRI Scope 1 and 2 Approach

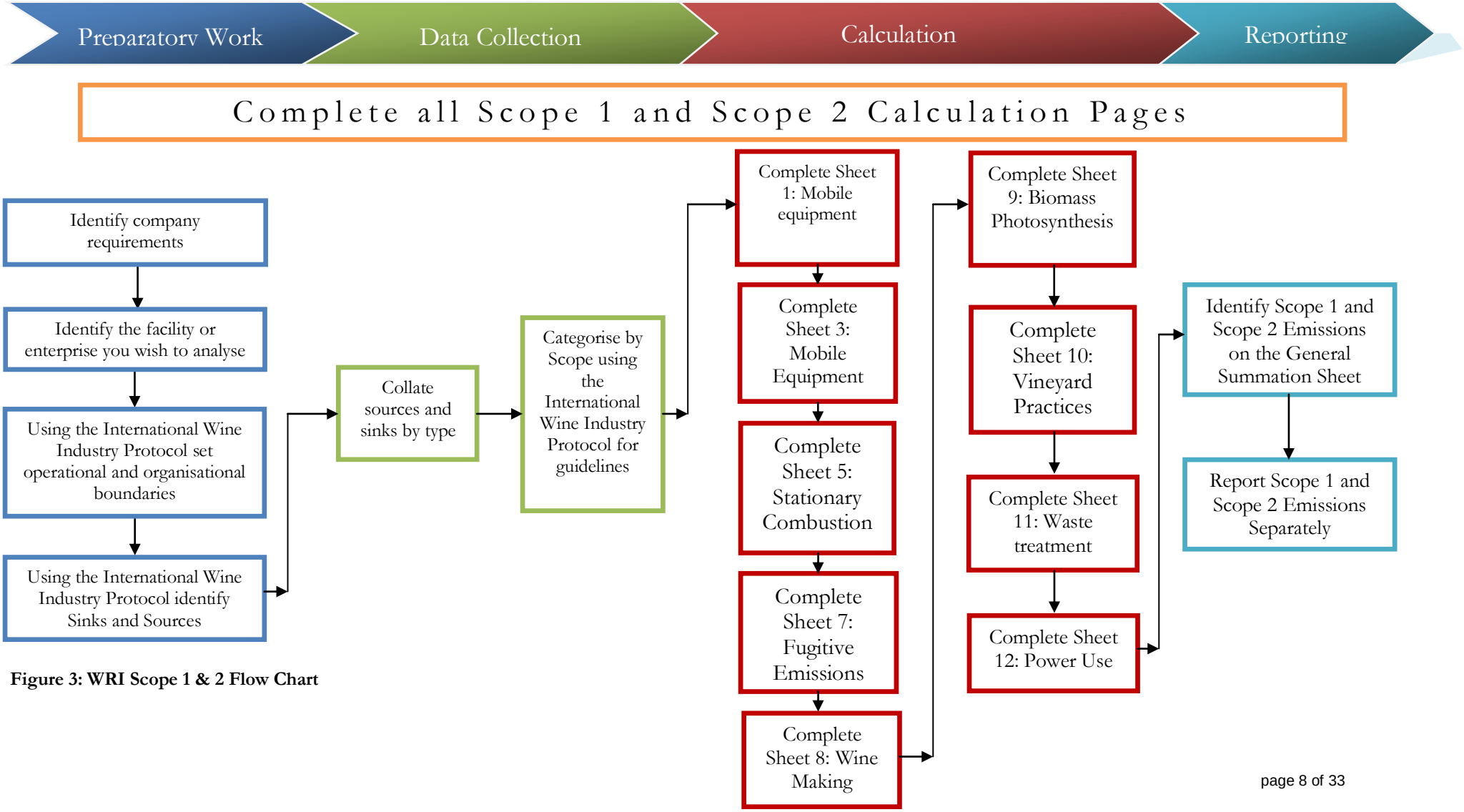

Figure 3: WRI Scope 1 & 2 Flow Chart

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2 Calculator Instructions and Basic Methodology

Launch the calculator by opening the Excel file, Wine Industry GHG Calculator V1.1. Do not update links. Make sure that macros are enabled. If your computer is set up at a high level of security this may need to be reduced to allow the macros to run. The calculator should start on the Introduction Tab. If it does not, please click on the left tab, named "Introduction."

2.1 Introduction Sheet

The purpose of the introduction sheet is to identify the country and region of a user. Regions are based upon electrical supply grids and are not necessarily state/country based. Users are asked to click upon the particular geographical area in which their company operates. For example a Californian Vineyard would click on the blue region on the US map. The user is then identified by region and electrical supply grid.

Units of measure are automatically set to represent those specific to the region in which the user's company is based. For example, as the United States was selected in the previous example, liquid volume will now be represented in US Gallons throughout the calculator. Scope 2 emission factors are related to electrical power and are highly dependent upon the region. Scope 2 emission factors are set when the user clicks on the map.

After selecting the region in which their company operates the user is then encouraged to click on one of the red buttons in the top right hand corner which are labelled "Start AB32 Accounting" or "Start Carbon Footprint or Embodied Carbon Accounting". This will take the user to the appropriate first page.

The 'Move to next page' or 'move forward' button is a concept repeated on most pages enabling the user to systematically navigate through the calculator.

2.2 AB32 Accounting

2.2.1 Stationary Combustion

Stationary combustion, as defined in the Protocol, is all combustion related activities that occur in fixed items, examples include hot water heaters, boilers and generators. Users are encouraged to collect all fuel receipts and dockets that relate to stationary combustion equipment. The fuel use needs to be categorised and summed by type. Users enter the quantity of fuel used in the combustion device in Column C against the appropriate fuel type. For example, if your operation has 1 boiler and 1 generator that both consume 15,000 Gal (US) of diesel per annum, then you would enter 30,000 into cell C31. You might like to add a comment into cell B31 along the lines of "Boiler and Generator."

All fuels used within stationary combustion devices must be accounted for within this section of the model.

2.2.2 Fuel Quantity Consumed

This is a Scope 1 entry page that relates to all mobile equipment defined as part of Scope 1 within the protocol. Users are only to enter information relating to their Scope 1 emissions. In order to operate this calculation page, users will need to collect all Scope 1

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fuel documents from within their company and categorise them by type. For example, if the only Gasoline/Petrol use within your company is in fleet cars, and you have four of them that consume 3,500, 2,500, 6,000 and 9,000 Gal, then you would enter the sum of these four, 21,000 into cell C27. You may wish to add a comment to cell B27 to remind you what that the fuel use was for. Users need to ensure that all mobile operating equipment defined as Scope 1 within the protocol has been accounted for.

Where possible users are encouraged to enter their mobile equipment within the fuel quantity consumed section. However, if users do not have quantity based records, an emission approximation can be made using the distance based calculation method.

Users will also need to calculate the methane and nitrous oxide emissions as part of the mobile equipment emissions. This is done by selecting the vehicle category, from column A, rows 48 to 60 and then entering the miles travelled into column B.

2.2.3 Distance Travelled – Mobile Equipment

Occasionally organisations may not have complete records kept to indicate the volume of fuel consumed in their Scope 1 mobile operating equipment. In some cases it may be possible to gain some information by understanding the distance travelled. This might come in the form of odometer readings or log book records. It is critical to ensure that companies, who adopt this method and the quantity based method at the same time, do not double count emissions sources. There must be a clear accounting principle to differentiate between the quantity based method and the distance travelled method.

In order to use this section of the calculator, users need to ensure that there are on the Mobile Equipment – Distance Based Page. It is thought that this method will generally be used for cars, rather than plant related equipment such as forklifts and tractors. The pink cells are user choice cells. The user can select the type of car used by clicking on the drop down button. The units should be correct and familiar to the user as they were selected at the introduction page.

In Column D users are encouraged to enter the distance travelled against an appropriate description of the vehicle on question. Next, the type of travel is selected, either city or highway, this can be done by using the drop down buttons in Column E. In most cases highway and city travel will have to be partitioned individually for each car. A list of cars is contained within the pink cells, C21:C26, users should be able to find their exact car or a very close approximation to their car.

Users will also need to calculate the methane and nitrous oxide emissions as part of the mobile equipment emissions. This is done by selecting the vehicle category, from column A, rows 30 to 42 and then entering the miles travelled into column B.

2.3 WRI or PAS 2050 Accounting

2.3.1 Fuel Quantity Consumed

This is a Scope 1 entry page that relates to all mobile equipment defined as part of Scope 1 within the protocol. Users are only to enter information relating to their Scope 1 emissions. In order to operate this calculation page, users will need to collect all Scope 1 fuel documents from within their company and categorise them by type. For example, if

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the only Gasoline/Petrol use within your company is in fleet cars, and you have four of them that consume 3,500, 2,500, 6,000 and 9,000 Gal, then you would enter the sum of these four, 21,000 into cell C27. You may wish to add a comment to cell B27 to remind you what that the fuel use was for. Users need to ensure that all mobile operating equipment defined as Scope 1 within the protocol has been accounted for.

Where possible users are encouraged to enter their mobile equipment within the fuel quantity consumed section. However, if users do not have quantity based records, an emission approximation can be made using the distance based calculation method.

If users have information relating to the distance travelled by their Scope 1 vehicles but not the quantity of fuel consumed, then they are encouraged to click on the red button in the top left hand corner of the calculation page, to be directed to the distance based mobile fuels calculation page. Users who do not wish to enter distance based information can move directly to the Stationary Combustion page by clicking on the appropriate red button in the top right hand corner.

2.3.2 Distance Travelled

Occasionally organisations may not have complete records kept to indicate the volume of fuel consumed in their Scope 1 mobile operating equipment. In some cases it may be possible to gain some information by understanding the distance travelled. This might come in the form of odometer readings or log book records. It is critical to ensure that companies, who adopt this method and the quantity based method at the same time, do not double count emissions sources. There must be a clear accounting principle to differentiate between the quantity based method and the distance travelled method.

In order to use this section of the calculator, users need to ensure that there are on the Mobile Equipment – Distance Based Page. It is thought that this method will generally be used for cars, rather than plant related equipment such as forklifts and tractors. The pink cells are user choice cells. The user can select the type of car used by clicking on the drop down button. The units should be correct and familiar to the user as they were selected at the introduction page.

In Column D users are encouraged to enter the distance travelled against an appropriate description of the vehicle on question. Next, the type of travel is selected, either city or highway, this can be done by using the drop down buttons in Column E. In most cases highway and city travel will have to be partitioned individually for each car. A list of cars is contained within the pink cells, C21:C26, users should be able to find their exact car or a very close approximation to their car.

2.3.3 Stationary Combustion

Stationary combustion, as defined in the Protocol, is all combustion related activities that occur in fixed items, examples include hot water heaters, boilers and generators. Users are encouraged to collect all fuel receipts and dockets that relate to stationary combustion equipment. The fuel use needs to be categorised and summed by type. Users enter the quantity of fuel used in the combustion device in Column C against the appropriate fuel type. For example, if your operation has 1 boiler and 1 generator that both consume 15,000 Gal (US) of diesel per annum, then you would enter 30,000 into cell C31. You might like to add a comment into cell B31 along the lines of "Boiler and Generator."

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All fuels used within stationary combustion devices must be accounted for within this section of the model.

2.3.4 Fugitive Emissions

Fugitive Emissions are defined as emissions of Greenhouse Gases that arise from leaks or spills. In the case of the wine industry, sources such as refrigeration equipment and gas insulated electrical switchboards are included. Natural gas combustion devices are generally known to emit fugitive emissions from poor pipe work connections. Fugitive emissions from natural gas are calculated automatically based on the amount of natural gas consumed within stationary combustion devices.

Two methods are available for users to calculate their fugitive emissions. In both cases users will need to identify the type of gas used within their equipment.

2.3.5 Recharge Weight

Emissions can be quantified by using the annual recharge weight (from service documents) of refrigeration gases. If annual service documents can be traced that show the recharge weight of gas, then users are encouraged to adopt this value rather than the default loss method. The pink cells in Column B are user choice cells; users can select the type of gas within their equipment. Column C is a green user input Column; users are encouraged to enter the annual recharge weight of gas from service documents into this Column.

2.3.6 Default Fugitive Losses

If service documents are not available or do not show the annual recharge weight, then the default loss rate method should be adopted. Users will need to know the total gas weight within their device. This information should be available in the equipment specification documents.

Fugitive emissions from natural gas are based on a default emission factors. The amount of gas consumed is imported from the stationary combustion page. Users do not need to enter any values into this section of the calculator.

2.3.7 Winemaking Practices

Although part of the short-term carbon cycle, understanding the CO_2 produced in the winemaking process is an important part of this calculator.

Users are required to enter:

- Volume of fruit;
- Typical Press extraction;
- Extra juice added to the ferment;
- Average Baume;
- Residual sugar in the finished wine;
- Amount of Malic Acid converted to Lactic Acid; and
- Amount of Carbon Dioxide used in the winemaking process.

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The process has been divided into white, red, sparkling and fortified product. All user entry cells have been coloured green. There is space to make comment in Column H. All that users need to do is enter these data. The carbon dioxide generated from wine making will then be automatically calculated.

2.3.8 Biomass Photosynthesis

Biomass photosynthesis is also considered part of the short-term carbon cycle but is included within the calculator to give a better understanding of emission and sink sources within the industry. Users are asked to enter the harvest size of their red, white, sparkling and fortified dedicated fruit. An average Baume of this fruit is also requested in order to calculate the total sugar content. Comments can be made in Column I.

2.3.9 Vineyard Practices

The vineyard practices page has three areas that require user information. The first section is concerned with fertiliser or nitrogen addition. Users are requested to enter the amount of fertiliser into Column B and the nitrogen content of that fertiliser in Column F. Comments can be added to Column A.

The second section of this calculation page is concerned with emissions that result from soil cultivation. Users are requested to enter the vineyard area that is cultivated. Land areas are entered into Column B.

The third section of this page is concerned with vineyard permanent row cropping. Users are requested to enter the land area of their vineyard that is under permanent row cropping. Land areas are entered into Column B.

2.3.10 Scope 1 Waste Disposal

Waste disposal is only categorised as part of Scope 1 if it is carried out within your operating boundary. This calculation page has been developed for both solid and liquid waste.

Initially users are prompted to enter their solid waste disposal requirements. Users are requested to select the type of waste from the drop down list in Column B. The weight of waste is then to be entered into Column C. A comment can be added to Column A. Users have space to account for various types of solid wastes, each row is to be used for a different type or category of waste.

After completing the solid waste section, users complete the waste water section. Users need to understand the following factors involved in their waste water streams:

- Volume of waste water;
- Source of waste water;
- Chemical oxygen demand (COD) (mg/L) of their waste water; and
- How much, if any, methane is recovered within the treatment of that waste water (please note that if methane is flared within the waste treatment site, this is comparable with recovery from a Greenhouse Gas perspective).

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2.3.11 Scope 2 Purchased Power

Scope 2 purchased power is clearly defined within the protocol. It relates to all purchased electricity.

As a minimum, users need to enter their annual power consumption into Column D. More than one row has been provided for users to separate their power consumption as most appropriate. Comments and facility or source information can be added to Columns C and A respectively.

2.3.12 Scope 3 Packaging

Packaging is a complex area to model. There are many subtleties that influence the overall accuracy of the calculations

The use of this calculation page is relatively straight forward. Users are required to enter the number of units used in Column D and the average weight of those units into Column E. Comments can be made in Column C.

In some cases users may have to calculate their individual unit requirements from bulk information on packaging products. Information has been displayed on a unit basis to allow for easy comparison between different packaging options.

2.3.13 Scope 3 Contract Machinery

This page is designed to calculate emissions that arise from the use of contract machinery. Two broad categories have been considered, helicopters for frost fighting and tractor or tractor like vineyard equipment including harvesters.

In order to estimate the emissions from the use of helicopters, users are prompted for the helicopter size; this can be changed by using the drop down list, in Column C. Users are then asked for the number of hours the helicopter was used for. This information is entered into Column D.

Tractor emissions can be calculated in two ways. Users can select either, a large or small tractor, from the user choice cells C20 and C21, or enter the Power Take Off (PTO) horsepower rating of the equipment. The number of hours the tractors operate is entered into Column D. The fuel type is then selected from Column E.

2.3.14 Scope 3 Transport

The Scope 3 transport calculation page is the most involved and complex page of this version of the calculator. The level of complexity reflects the significance of Scope 3 transport in evaluating a carbon footprint.

When adopting the freight method of calculation, users will need to know the total freight distance and also the total freight weight.

Users are requested to begin with their road based transporting requirements. Please note that it is important to remember that this page is dedicated to Scope 3 only. Users enter the distance travelled into Column C. Users are then requested to choose the type of travel either City travel or Highway travel. This can be done using the choices offered in Column D. In addition, if the transport is road freight related users can adopt this section of the calculator.

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Users are required to break down their freighting requirements into type (road, air, rail, and ship), distance and weight.

For rail and shipping freight, users have the option to select the specific type of freight train or ship, by using the user choice cells in Column B. For rail freight the "Average Locomotive" setting should be selected when users are uncertain as to the type of locomotive used.

2.3.15 Scope 3 Purchased Wine Products

This page is designed to estimate the Greenhouse Gas impact of items commonly used in the production of wine. Users can select the purchased product from the drop down lists in Column B. The quantity of product is then entered into Column C. Lastly a description can be added to Column A.

2.3.16 Scope 3 Waste Disposal

Waste disposal is only categorised as part of Scope 3 if the disposal occurs on premises not under the user's control. Examples include government controlled landfill sites and municipal waste water treatments sites.

User comment cells are shaded green, user choice cells are shaded pink. Initially users are prompted to enter their solid waste disposal requirements. Users are requested to select the type of waste from the drop down list in Column B. The weight of waste is then to be entered into Column C. A comment can be added to Column A. Users have space to account for various types of solid wastes, each row is to be used for a different type or category of waste.

After completing the solid waste section users are required to complete the waste water section. Users need to understand the following factors involved in their waste water streams:

- Volume of waste water;
- Source of waste water;
- COD (mg/L) of their waste water; and
- How much, if any, methane is recovered within the treatment of that waste water (please note that if methane is flared within the waste treatment site, this is comparable with recovery).

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3 Appendix A: Excel Calculator

Welcome to the International Wine Industry Greenhouse Gas Accounting Calculator

Move To Next Page

In order to select the familar units and region specific emission factors, please select a region from the coloured maps below.

Insert Example Entries

Delete Example Entries

You have selected the following country and region: **United States**

You have selected the following electrical grid: **SPP North**

Units Used Within the Model

	Volume	Energy	Mass	Mileage	Gas Units	Distance	Crush	Power	Sugar	Land Area
Australia	L	GJ	Kg	L/100Km	scM	Km	Tonnes	kWh	Brix	ha
New Zealand	L	GJ	Kg	L/100Km	scM	Km	Tonnes	kWh	Brix	ha
United States	Gal (US)	Therm	lb	mpg	scf	mil	ton (short	kWh	Brix	Acre
South Africa	L	Btu	Kg	L/100Km	scM	Km	Tonnes	kWh	Brix	ha
United Kingdom	Gal (imp)	Btu	lb	L/100Km	scf	mil	ton (long)	Therm	Brix	ha

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Mobile Equipment - Fuel Quantity Based Scope 1

Move Back

Click this button to move to the **Distance Based** Fuel Page

Click here to move to the Stationary **Combustion** Page

Fuel used				Total Emissions	
Type of Fuel Used	Comment on Use	Amount of Fuel	Fuel Unit	Kg CO2	Quality Rank
Gasoline / petrol	Lease Cars	5500	Gal (US)	49657.0	A
Kerosene			Gal (US)	0.0	A
Diesel	Tractors (Vineyard)	8200	Gal (US)	85333.1	A
LPG	Fork Lifts (Winery)	4000	Gal (US)	23857.0	A
Bituminous coal			lb	0.0	A
Butane			Gal (US)	0.0	A
Propane			Gal (US)	0.0	A
Wood, wood waste			lb	0.0	C
Natural gas			scf	0.0	A
Total				**158847.0**	

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Mobile Equipment AB32- Fuel Quantity Based - Non Compulsory

Move Back

Click this button to move to the **Distance Based** Fuel Page

Click here to move to the Stationary **Combustion Page**

Fuel used				Total Emissions	
Type of Fuel Used	Comment on Use	Amount of Fuel	Fuel Unit	Kg CO2	Quality Rank
Gasoline / petrol		50000	Gal (US)	451426.9	A
Kerosene			Gal (US)	0.0	A
Diesel		21000	Gal (US)	218535.9	A
LPG			Gal (US)	0.0	A
Bituminous coal			lb	0.0	A
Butane			Gal (US)	0.0	A
Propane			Gal (US)	0.0	A
Wood, wood waste			lb	0.0	C
Natural gas			scf	0.0	A
Total				669962.8	

Methane And Nitrous Oxide Emissions from Mobile Equipment			
Vehicle Type	Distance Travelled in Vehicle (miles)	Emissions CH4 (tonnes)	Emissions N2O (tonnes)
Heavy Duty Vehicle (>5751 GVWR) Diesel 1966 - 1982		0	0
Passenger Car Gasoline 1993	50	0.0000025	0.0000025
Passenger Car Gasoline 1994 - 1999		0	0
Heavy Duty Vehicle (>5751 GVWR) Gasoline - 1981	54123	0.02327289	0.00216492
Light Truck (<5750 GVWR)Diesel All Years		0	0
Heavy Duty Vehicle (>5751 GVWR) Diesel 1996 -		0	0
Passenger Car Gasoline 1975 - 1979		0	0
Passenger Car Gasoline 1980 - 1983		0	0
Passenger Car Gasoline 1973 - 1974		0	0
Passenger Car Gasoline 1994 - 1999		0	0
Passenger Car Gasoline 1984 - 1991		0	0
Passenger Car Gasoline 1966 - 1972		0	0
Passenger Car Gasoline 1992		0	0
Total		0.02327539	0.00216742

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Mobile Equipment - Distance Based

Move Forward

Move Back

	Transportation Activity					
	Transport description		Vehicle Efficiency		Emissions	
Land Or Road Based		Vehicle Distance				
Transport Description	Vehicle Type	mil	Type	Mileage Value	Kg CO2	Quality Rank
	Small Gasoline Automobile		City Travel	26.00	0	C
	Medium Gasoline Automobile		Hwy Travel	30.00	0	C
Company Car	Large Gasoline Automobile	15000	City Travel	18.00	4681.023	C
	LPG Automobile		City Travel	60.00	0	C
	Mini Van Gasoline		City Travel	18.00	0	C
	Large Van Gasoline		City Travel	14.00	0	C
	Light Truck Gasoline		City Travel	14.00	0	C
	Light Truck Diesel		City Travel	15.00	0	C
	Heavy Truck Gasoline		City Travel	6.00	0	C
Vineyard Company Truck	Heavy Truck Diesel	25000	City Travel	7.00	23064.4764	C
	Bus Diesel		City Travel	6.70	0	C
	Motor Cycle Gasoline		City Travel	60.00	0	C
	TOYOTA Camry 2.4 Auto-L5 Gasoline		Hwy Travel	31	0	B
	BUICK Allure 3.6 Auto-L4 Gasoline		City Travel	17	0	B
	AUDI R8 4.2 Man-6 Gasoline		City Travel	13	0	B
	AUDI R8 4.2 Man-6 Gasoline		City Travel	13	0	B
	SUBARU Forester 2.5 Man-5 Gasoline		City Travel	20	0	B
	HONDA Accord 2.4 Auto-L5 Gasoline		Hwy Travel	31	0	B
Total					27745.5	

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Mobile Equipment AB32- Distance Based - Non Compulsory

Move Forward
Move Back

	Transportation Activity						
	Transport description		Vehicle Efficiency			Emissions	
Land Or Road Based		Vehicle Distance					
Transport Description	Vehicle Type	mil	Type	Mileage Value	Mileage Units	Kg CO2	Quality Rank
	Small Gasoline Automobile		City Travel	26.00	mpg	0	C
	Medium Gasoline Automobile		Hwy Travel	30.00	mpg	0	C
	Large Gasoline Automobile		City Travel	18.00	mpg	0	C
	LPG Automobile		City Travel	60.00	mpg	0	C
	Mini Van Gasoline		City Travel	18.00	mpg	0	C
	Large Van Gasoline		City Travel	14.00	mpg	0	C
	Light Truck Gasoline	500000	City Travel	14.00	mpg	200104.8	C
	Light Truck Diesel		City Travel	15.00	mpg	0	C
	Heavy Truck Gasoline		City Travel	6.00	mpg	0	C
	Heavy Truck Diesel		City Travel	7.00	mpg	0	C
	Bus Diesel		City Travel	6.70	mpg	0	C
	Motor Cycle Gasoline		City Travel	60.00	mpg	0	C
	TOYOTA Camry 2.4 Auto-L5 Gasoline		Hwy Travel	31	mpg	0	B
	BUICK Allure 3.6 Auto-L4 Gasoline		City Travel	17	mpg	0	B
	AUDI R8 4.2 Man-6 Gasoline		City Travel	13	mpg	0	B
	AUDI R8 4.2 Man-6 Gasoline		City Travel	13	mpg	0	B
	SUBARU Forester 2.5 Man-5 Gasoline		City Travel	20	mpg	0	B
	HONDA Accord 2.4 Auto-L5 Gasoline		Hwy Travel	31	mpg	0	B
Total						200104.8	

Methane And Nitrous Oxide Emissions from Mobile Equipment			
Vehicle Type	Distance Travelled in Vehicle (miles)	Emissions CH4 (tonnes)	Emissions N2O (tonnes)
Passenger Car Gasoline 1966 - 1972		0	0
Passenger Car Gasoline 1993	50	0.0000025	0.0000025
Passenger Car Gasoline 1994 - 1999		0	0
Heavy Duty Vehicle (>5751 GVWR) Gasoline - 1981		0	0
Light Truck (<5750 GVWR)Diesel All Years		0	0
Heavy Duty Vehicle (>5751 GVWR) Diesel 1996 -		0	0
Passenger Car Gasoline 1975 - 1979		0	0
Passenger Car Gasoline 1980 - 1983		0	0
Passenger Car Gasoline 1973 - 1974		0	0
Passenger Car Gasoline 1994 - 1999		0	0
Passenger Car Gasoline 1984 - 1991		0	0
Passenger Car Gasoline 1966 - 1972		0	0
Passenger Car Gasoline 1992		0	0
Total		0.0000025	0.0000025

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Stationary Combustion- Fuel Quantity Based

Move Forward

Move Back

Fuel used				Total Emissions	
Type of Fuel Used	Comment on Use	Amount of Fuel	Fuel Unit	Kg CO2	Quality Rank
Gasoline / petrol			Gal (US)	0	B
Kerosene			Gal (US)	0	B
LPG			Gal (US)	0	B
Natural gas	Winery Boiler	10000	scf	623	B
Diesel	Vineyard Generator	5500	Gal (US)	57335	B
Aviation gasoline			Gal (US)	0	B
Butane			Gal (US)	0	B
Propane	Hot water service	200	Gal (US)	1169	B
Distillate fuel oil			Gal (US)	0	B
Residual Fuel oil#4			Gal (US)	0	C
Residual Fuel oil#5			Gal (US)	0	C
Residual Fuel oil#6			Gal (US)	0	C
Lubricants			Gal (US)	0	C
Anthracite			lb	0	C
Bituminous coal			lb	0	C
Wood, wood waste	Warehouse heating	5000	lb	3924	D
Total				**63050**	

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Stationary Combustion AB32- Fuel Quantity Based

Move Forward

Move Back

Fuel used				Methane Emissions	Nitrous Emissions	Carbon Dioxide Emissions	
Type of Fuel Used	Comment on Use	Amount of Fuel	Fuel Unit	kg CH4	kg N20	kg CO2	Quality Rank
Gasoline / petrol			Gal (US)	0.00	0.00	0	B
Kerosene			Gal (US)	0.00	0.00	0	B
LPG		540	Gal (US)	0.05	0.01	3127	B
Natural gas		5000000000	scf	4994.48	554.94	272478400	B
Diesel			Gal (US)	0.00	0.00	0	B
Aviation gasoline			Gal (US)	0.00	0.00	0	B
Butane			Gal (US)	0.00	0.00	0	B
Propane			Gal (US)	0.00	0.00	0	B
Distillate fuel oil			Gal (US)	0.00	0.00	0	B
Residual Fuel oil#4			Gal (US)	0.00	0.00	0	C
Residual Fuel oil#5			Gal (US)	0.00	0.00	0	C
Residual Fuel oil#6			Gal (US)	0.00	0.00	0	C
Lubricants			Gal (US)	0.00	0.00	0	C
Anthracite			lb	0.00	0.00	0	C
Bituminous coal			lb	0.00	0.00	0	C
Wood, wood waste		5000	lb	0.00	0.00	3607	D
Total				4994.53	554.95	272485133	

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Fugitive Emissions - Halogenated Fluro Carbon Refrigeration Systems

Move Forward

Move Back

	Source				
Description	**Refrigeration Gas Used**	**Annual Re-Charge Weight**	**Weight Unit**	**Total CO2 Equivalent (Kg)**	**Quality Rank**
Wine vat Cooling system	HFC 32	5.00	lb	1474.2	A
	HFC 32		lb	0	A
	HFC-43-10mee		lb	0	A
	HFC -134a		lb	0	A
	HFC- 134		lb	0	A
	HFC -134a		lb	0	A
	HFC -152a		lb	0	A
	HFC 41		lb	0	A
	HFC-23		lb	0	A
	HFC-43-10mee		lb	0	A
		Use in Kg	**Unit**		
	Source	**Amount lost**	**Unit**		
Methane Loss from Stationary Combustion	10000.00	1.00	scf	0.039544691	D
Sub Total				1474.239545	
Defult Loss	**Refrigeration Type**	**Charge Size**	**Charge Units**	**Total CO2 Equivalent (Kg)**	
Canteen Fridges	Domestic refrigeration	1.00	lb	8.8452	C
	Domestic split system		lb	0	C
	Domestic refrigeration		lb	0	C
	Gas insulated switchgear		lb	0	C
Sub Total				8.8452	C
Total				**1483.1**	

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Wine Making Practices Calculations *Not Reported*

Move Forward

Move Back

Wine Type	Units	White	Sparkling	Red	Fortified	Total	Notes
Crush Size	ton (short)	5,000	850	7,500	300	13,650	
Typical Press Extraction (%)		70	75	70	70		
Additional Juice for Ferment	ton (short)	250	300	6,000	95	6,645	
Total Ferment Size	ton (short)	3,750	938	11,250	305	6,645	
Average Baume		14.00	14.00	14.50	16.00		
Average Brix		24.52	24.52	25.39	28.02		
Wine Residual Sugar %		2.00	2.00	2.00	12.00		
Malo Fermentation (Enter amount of Malic Acid)	ton (short)	5.00	8.00	15.00	0.00	28.00	
Carbon Dioxide Used in Processing	ton (short)	25.00	35.00	60.00	12.00	132	
Conversion Factor to SI Units		0.907	0.907	0.907	0.907	0.907	
SI Units		22.680	31.752	54.432	10.886	119.750	
Total CO2 Emissions	**ton (short)**	**22.7**	**31.8**	**54.4**	**10.9**	**119.8**	
	Quality Rank	A	A	A	A	A	

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Vineyard Vine Biomass Photosynthesis

Move Forward

Move Back

	Units							
Wine Type		**White**	**Sparkling**	**Red**	**Fortified**	**Total**	**Notes**	Quality Rank
Crush Size	ton (short)	7500.00	850.00	7850.00	125.00	16325.00		
Average Baume at Harvest		14.00	14.00	14.00	16.00			
Total CO2 Sequestered in Sugar Production	Tonnes (CO2)	2398.08	271.78	2509.99	45.68	5225.54		E
Total CO2 Consumed in Carbohydrate reserves (starch) production	Tonnes	1176.42	133.33	1231.32	22.41	2563.47		E
Total CO2 Sequestered in Permanent structures	Tonnes	520.34	58.97	544.62	9.91	1133.84		E
Total CO2 Consummed in Current season's shoots	Tonnes	4321.07	489.72	4522.72	82.31	9415.82		E
Total CO2 Sequestered in Biomass in clusters	Tonnes	2895.80	328.19	3030.93	55.16	6310.08		E
Respiration	Tonnes	11311.71	1281.99	11839.59	215.46	24648.75		E
Total CO2 Consumed in Above Ground Biomass	Tonnes	7737.21	876.88	8098.28	147.38	16859.75		E
Total CO2 Sequestered in Roots	Tonnes	928.47	105.23	971.79	17.69	2023.17		F
Prunings: Total CO2 Sequestered into Ground	Tonnes	1944.48	220.37	2035.23	37.04	4237.12		X
Pruning Decompositon CO2 Emitted	Tonnes	2376.59	269.35	2487.50	45.27	5178.70		X
Total CO2 Sequestration	Tonnes	6289.08	712.76	6582.57	119.79	13704.21		X
Total Biomass CO2 Emissions	Tonnes	3553.01	402.67	3718.81	67.68	7742.17		X
Total CO2 Balance (- is sequestration)	**Tonnes**	**-2736.1**	**-310.1**	**-2863.8**	**-52.1**	**-5962.0**		X

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Vineyard Practices

Move Forward

Move Back

Fertiliser Addition Emissions (Nitrous Oxide)					
Comment	Fertiliser Applied	Units	Nitrogen Content %	CO2e Tonnes Emitted	Quality Rank
Top Growth	3000.00	lb	75.00	4.97	F
Best Fruit	2500.00	lb	85.00	177.22	F
		lb		0.00	F
		lb		0.00	F
Soil Emission (nitrous Oxide)					
Comment	Vineyard Area	Units		CO2e Tonnes Emitted	
	75.00	Acre		990.00	X
		Acre		0.00	X
		Acre		0.00	X
Sub Total				1172.19168	X
Row Cropping Sequestion (Carbon)					
Comment	Vineyard Area	Units	Cropped Vineyard %	CO2e Tonnes Sequestrated	
Vineyard 2	50.00	Acre	95.00	14.416926	X
		Acre		0	X
		Acre		0	X
Total CO2e Tonnes Emitted				**1157.774754**	X

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Scope 1 Waste

Move Forward

Move Back

Solid Waste

Comments	Solid Waste Type	Disposal Amount	Units	CO_{2e} emission factor KgCO2/Tonne waste			CO2e kg from Waste disposal	Quality Rank
Packaging Warehouse Waste	Paper and Paper Board	10.00	ton (short)	400.00			4,000.00	C
Winery Waste	Lees	30.00	ton (short)	150.00			4,500.00	F
	Vineyard Leafy Waste		ton (short)	170.00			0.00	C
	Lees		ton (short)	150.00			0.00	F
	Co-mingled		ton (short)	150.00			0.00	C
	Vineyard Woody Pruning's		ton (short)	500.00			0.00	C
	Grape Marc, Pommace, grape stalks and stems		ton (short)	170.00			0.00	E
	Metals, Plastics and Glass		ton (short)	0.00			0.00	A
Sub Total							8,500.00	

Waste Water

Comments	Source of Waste Water	Volume of Waste Water	Volume Unites	Waste Water COD	Waste Water COD units	Recoverable Methane in an inventory year (tonnes)	CO2e kg from waste water	
Winery Waste	Winery	8000.00	Gal (US)	150.00	mg/l		186145.092	C
Office Block	Abloution	500.00	Gal (US)	250.00	mg/l	8.00	17710.11375	C
			Gal (US)		mg/l		0	C
			Gal (US)		mg/l		0	C
			Gal (US)		mg/l		0	C
			Gal (US)		mg/l		0	C
Sub Total							203,855.21	C
Total							**212355.2**	

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Scope 2: Purchased Utility

Move Forward

Move Back

Facility / source description	Electrical Grid	Comments	Electrical Consumption	Units	CO_2 emission factor gCO2/kWh	Scope 2 Indirect Emissions kg/CO2	Quality Rank	Scope 3 EF	Scope 3: Transmission and Distribution Losses Kg CO2	Quality Rank
Winery	SPNO	Meter 1	85000	kWh	912.26	77,541.78	B	0.10	8500.0	D
Vineyard	SPNO	Meter 1	6000	kWh	912.26	5,473.54	B	0.10	600.0	D
	SPNO			kWh	912.26	0.00	B	0.10	0.0	D
	SPNO			kWh	912.26	0.00	B	0.10	0.0	D
	SPNO			kWh	912.26	0.00	B	0.10	0.0	D
	SPNO			kWh	912.26	0.00	B	0.10	0.0	D
	SPNO			kWh	912.26	0.00	B	0.10	0.0	D
	SPNO			kWh	912.26	0.00	B	0.10	0.0	D
	SPNO			kWh	912.26	0.00	B	0.10	0.0	D
	SPNO			kWh	912.26	0.00	B	0.10	0.0	D
	SPNO			kWh	912.26	0.00	B	0.10	0.0	D
	SPNO			kWh	912.26	0.00	B	0.10	0.0	D
Total			91000	kWh		83015.32141			9100.0	

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Scope 3 Packaging Emissions

Move Forward

Move Back

	Packaging Materials	Description	Number of units purchased	Weighted Averge Unit Weight	Weight Units	NET Global Warming Potential T CO2-e (GHG)	Quality Rank
Bottles / Containers	Glass	All Glass	8500	0.5	lb	3.7	F
	PET	All PET	6500	0.2	lb	1.9	E
	Tetra Brik (1ltr)				lb	0.0	F
	Tetra Prisma (1ltr)				lb	0.0	F
	Aluminium Cans					PH	X
Wine Bags	Aluminium Bag				lb	0.0	F
	Plastic Tap				lb	0.0	F
	Paper / Cardboard box				lb	0.0	F
Closures	Aluminium Screw Caps (35% recycled)	All metal closures	12000	0.001	lb	0.1	F
	Natural Cork & PVC Capsule				lb	0.0	F
	Agglomerate Cork & PVC Capsule				lb	0.0	F
	Agglomerate Cork & Aluminium Capsule				lb	0.0	F
	Glass Stoppers					PH	X
	Synthetic Cork					PH	X
	ZORK					PH	X
Fibre Packaging	Pallet Pads / Layer Boards		500	1.2	lb	0.1	F
	6 Pack Cartons		12000	0.3	lb	0.5	F
	12 Pack Cartons				lb	0.0	F
	6 Pack Dividers				lb	0.0	F
	12 Pack Dividers				lb	0.0	F
Wooden Products	pallets, non-returnable		500	8.5	lb	1.3	F
	pallets, returnable				lb	0.0	F
Total						**6.2**	

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Contract Machinery

Move Forward

Move Back

	Transportation Activity				
			Vehicle Efficiency	Emissions	
		Vehicle Distance			
Transport Description	Vehicle Type	Hours Used	Fuel Type	Kg CO2	Quality Rank
Frost Fighting June	Extra Large Helicopter	25	Aviation gasoline	35968.616	D
Frost Fighting August	Medium Helicopter	56	Aviation gasoline	20142.42496	D
	Medium Helicopter		Aviation gasoline	0	D
	Large Helicopter		Aviation gasoline	0	D
	Small Helicopter		Aviation gasoline	0	D
	Harvester/ Tractor PTO Horsepower	Hours Used	Fuel Type		
Harvester	65	80	Gasoline/Petrol	2816.903856	D
Slashem (row cutters)	45	120	Diesel	2472.576868	D
			Gasoline/Petrol	0	D
			Diesel	0	D
			Gasoline/Petrol	0	D
Contractor 125	Large Tractor	35	Diesel	2185.358343	D
	Small Tractor		Diesel	0	D
Total				63585.88	

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Scope 3 transport

Move Forward

Move Back

	Transportation Activity							
	Transport description		Vehicle Efficiency			Units	Emissions	
Land Or Road Based		Vehicle Distance						
Transport Description	Vehicle Type	mil	Type	Mileage Value	Mileage Units	Fuel Used	Kg CO2	Quality Rank
	Small Gasoline Automobile		City Travel	26.00	mpg	Gasoline	0.0	C
	Medium Gasoline Automobile		City Travel	22.00	mpg	Gasoline	0.0	C
	Large Gasoline Automobile		City Travel	18.00	mpg	Gasoline	0.0	C
	LPG Automobile		City Travel	60.00	mpg	LPG	0.0	C
	Mini Van Gasoline		City Travel	18.00	mpg	Gasoline	0.0	C
	Large Van Gasoline		City Travel	14.00	mpg	Gasoline	0.0	C
	Light Truck Gasoline		Hwy Travel	14.00	mpg	Gasoline	0.0	C
	Light Truck Diesel		Hwy Travel	15.00	mpg	Diesel	0.0	C
	Heavy Truck Gasoline		City Travel	6.00	mpg	Gasoline	0.0	C
	Heavy Truck Diesel	594	Hwy Travel	3.92	mpg	Diesel	978.6	C
	Bus Diesel		City Travel	6.70	mpg	Diesel	0.0	C
	Motor Cycle Gasoline		City Travel	60.00	mpg	Gasoline	0.0	C
Total							978.6	
		Freight Weight	Freight Distance					
Road / Truck Freight		ton (short)	mil		Freight Tonne /km			
	Light Commercial Vehicle	2000	594		1942560.333		3496608.6	C
	Medium Weight Ridgid Truck	2000	594		1942560.333		345775.7	C
	Heavy Weight Articulated Truck	2000	594		1942560.333		223394.4	C
Total							4065778.8	
		Freight Weight	Freight Distance					
Rail Freight		ton (short)	mil		Freight Tonne /km			
	Average Locomotive	2000	594		1942560.333		51384.5	D
	EMD SD-40	2000	594		1942560.333		57456.6	C
	EMD - SD75	2000	594		1942560.333		47924.0	C
	Average Locomotive				0		0.0	D
Rail Freight Travel Total CO2							156765.2	
	Type	Freight Weight	Freight Distance					
Shipping Freight		ton (short)	mil		Freight Tonne /km			
	RoRo Cargo (Large)				0		0.0	D
	Bulk Dry				0		0.0	D
	Refrigerated Cargo				0		0.0	D
	Refrigerated Cargo				0		0.0	D
	RoRo Cargo (Small)				0		0.0	D
	Bulk Dry				0		0.0	D
	Container	2000	594		1226474.63		17833.5	D
	Bulk Dry				0		0.0	D
Shipping Freight Travel Total CO2							17833.5	
Air Travel Freight		ton (short)	mil		Freight Tonne /km			
	Long Haul				0		0.0	E
	Short Haul				0		0.0	E
Air Freight Travel Total CO2							0.0	
Scope 3 Travel / Transport Total							**4241356.1**	

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Purchased Wine Related Products

Move Forward

Move Back

	Source				
Description	Product Type	Quantity used	Weight Unit	Total CO2 Equivalent (Kg)	Quality Rank
Wine making Maker 1	Tartaric Acid	5000.00	lb	4536	X
	Purchase Jucie		lb	0	X
	Tartaric Acid		lb	0	X
Maker 3	Bentonite	12000.00	lb	10886.4	X
	Barrels		lb	0	X
	Bentonite		lb	0	X
	Purchased Wine		lb	0	X
	Tartaric Acid		lb	0	X
	Purchased Spirit		lb	0	X
	Purchase Jucie		lb	0	X
Total				15422.4	

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Scope 3 Waste

Move Forward

Move Back

Solid Waste

Comments	Solid Waste Type	Disposal Amount	Units	CO_{2e} emission factor KgCO2/Tonne waste			CO2e kg from Waste disposal	Quality Rank
	Paper and Paper Board		ton (short)	400.00			0.00	C
	Grape Marc, Pommace, grape stalks and stems		ton (short)	170.00			0.00	E
	Vineyard Leafy Waste		ton (short)	170.00			0.00	C
Waste to "We Treat it"	Lees	12.00	ton (short)	150.00			1,800.00	F
	Co-mingled		ton (short)	150.00			0.00	C
	Vineyard Woody Pruning's		ton (short)	500.00			0.00	C
	Vineyard Woody Pruning's		ton (short)	500.00			0.00	C
	Metals, Plastics and Glass		ton (short)	0.00			0.00	A
Sub Total							1,800.00	

Waste Water

Comments	Source of Waste Water	Volume of Waste Water	Volume Unites	Waste Water COD	Waste Water COD units	Recoverable Methane in a inventory year (tonnes)	CO2e kg from waste water	
Waste water to council treatment	Winery	12000.00	Gal (US)	250.00	mg/l	400.00	381362.73	C
			Gal (US)		mg/l		0	C
			Gal (US)		mg/l		0	C
			Gal (US)		mg/l		0	C
			Gal (US)		mg/l		0	C
			Gal (US)		mg/l		0	C
Sub Total							381,362.73	
Total							**383162.7**	