RESOLUTION OIV-CST 503AB-2015

GREENHOUSE GASES ACCOUNTING IN THE VINE AND WINE SECTOR – RECOGNISED GASES AND INVENTORY OF EMISSIONS AND SEQUESTRATIONS

THE GENERAL ASSEMBLY,

CONSIDERING the urgent need of developing an international and harmonised system for the calculation of the greenhouses gases (GHG) emissions and removals specific for the vitivinicultural sector, as it is required by the OIV resolution 425/2010,

CONSIDERING the action F.1 of the OIV 2012-2014 Strategic Plan which suggests developing a methodology for the calculation of the vine and wine industry greenhouse gases,

CONSIDERING the resolution OIV-CST 431-2011, establishing the General Principles of the GHG accounting in the vitivinicultural sector;

CONSIDERING the necessity to provide more specific information on the GHG emissions to be taken into consideration and on their valuation, stipulated by the resolution OIV-CST 431-2011;

CONSIDERING the works of the International panel on climate change (IPCC)

CONSIDERING relevant standards adopted by international organisations, included the environmental product declaration

RECOGNISES the difficulty to determine universal values of GHG emissions for each of the activities of the vitivinicultural sector.

DECIDES to adopt these recommendations for GHG emissions inventory in the vitivinicultural sector on the GHG to be taken into consideration and their warming potentials as well as on the activities and their impact to be considered;

AND DECIDES to provide more specific information on existing national and international methodologies for valuation of GHG emissions in a separate informative report, which will be updated on a regular basis by OIV experts.

Scope of the document

I. Recognised Green House Gases and their global warming potential

II. Components of the inventory of GHG

III. Quantification process

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Scope of the document

By the decision of the General Assembly of Tbilisi, Georgia (resolution 425/2010) the OIV decided to develop an **International Protocol for the accounting of the greenhouse gas emissions in grape and wine production (OIV GHG protocol).**

The **general principles** of the OIV GHG protocol were set up in October 2011 (resolution OIV-CST 431-2011). **The general objective** of the Protocol, as defined by the OIV-CST 431-2011 is "to provide organisations, businesses and other stakeholders with clear and consistent method for the complete assessment of the GHG emissions associated with vine and wine companies' activities".

Specific objectives of the OIV GHG protocol are:

- To help companies working in the vitivinicultural sector to prepare a GHG inventory that represents a true and fair account of their emissions, through the use of standardized approaches and principles.
- To simplify and reduce the costs of compiling a GHG inventory
- To provide business with information that can be used to build an effective strategy to manage and reduce GHG emissions
- To increase consistency and transparency in GHG accounting and reporting among various companies and GHG programs

This document aims to provide more specific information on the items to be considered when accounting for GHG emissions of an enterprise or of a specific product as well as detailed information on the GHG to be considered (inventory).

I. Recognised Green House Gases and their global warming potential

The vine and wine sector entails a series of activities which sequestrate and emit greenhouse gases. The OIV GHG protocol covers (OIV-CST 431-2011) the four greenhouse gases and two groups of gases considered under Kyoto Protocol:

- carbon dioxide (CO_2)
- methane (CH_4)
- nitrous oxide (N_2O)

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- sulphur hexafluoride (SF_6)
- hydrofluorocarbons (HFCs)
- perfluorocarbons (PFCs)

The following table presents the green house gases produced and sequestrated by various activities of the vitivinicultural sector:

Table 1 GHG gases in viticulture and examples of activities producing and storing them

Activity	Gases concerned
• Vine respiration and photosynthesis • Deforestation/Land use change (land clearing and tillage) • Combustion of fossil fuel	CO_2
• Anaerobic degradation of organic matter • Coal mines	CH_4
• Use of nitrogen fertilisers • transformation of nitrogen compounds in the soi	N_2O
• Use of refrigerant fluids (refrigerant gases	Hydro-fluorocarbons (HFC) SF6 Fugitive PFCs and SF6

The GHG have different lifetimes and different radiative forcing and therefore have different warming potentials. For the use of OIV GHG protocol we use the conversion to carbon dioxide equivalent in order to estimate the global emission of GHG of an enterprise or product in CO_2 equivalent, so to obtain the homogeneity of the units used and results obtained.

The values for carbon dioxide equivalents or Global Warming Potentials (GWP) of the GHG are those determined by the Intergovernmental Panel on Climate Change (IPCC). These data are subject to regular updates from the IPCC and it is strongly recommended to use the last version available .

Taking into account the specificities of the vitivinicultural sector the GWP values to be used are those determined for the 100 years time-horizon.

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II. Components of the inventory of GHG

A. Enterprise protocol

1. Emissions and storage of GHG in the framework of the Enterprise protocol (EP)

While estimating GHG emissions in the frameworks of the ENTERPISE PROTOCOL, the following emissions and sequestrations should be considered:

- Direct emissions for each GHG (scope 1)
- Direct suppression and storage of GHG (Scope 1)
- Emissions related to energy consumption (scope 2)
- Indirect emissions (scope 3)
- Indirect sequestration (scope 3)

All calculations should be based on a reference period that is justified and representative;

2. Inventory of activities to be taken into account in the vitivinicultural sector according to the general principles of the OIV GHG protocol

The following table (table 2) based on the general principles of the OIV GHG accounting protocol, aims to help in constructing the GHG inventory.

Table 2 Identification of company operational boundaries and classification of emissions and storage of GHG gases under one of each of the three scopes.

SCOPE 1 Direct greenhouse gas emissions (primary boundaries)	SCOPE 2 Purchased power utility (indirect GHG emissions) (primary boundaries)	SCOPE 3 Indirect greenhouse gas emissions (primary and secondary boundaries) Emissions from activities which are part of the core process of the enterprise but have been outsourced
EMISSIONS	EMISSIONS	EMISSIONS

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1. Vineyard	Purchased power utility. It is recommended to account separately for electricity consumption for the needs of: • Office/administration/Marketing • Wine production • viticulture	**Primary boundaries**
Land use change (conversion to a vineyard)		**1. Production of purchased grapes, musts and wines**
Biodegradation of vine structures in the soil (mandatory if accounted also as biomass carbon sequestration, otherwise recommendable	Purchased steam or heat (not important for wine industry)	Production of purchased grapes or must or wine (if the winery controls the production system of the purchased grapes or must)
N_2O emissions resulting from nitrogen fertilisation of the soil CH_4 emissions from soil, when occurring		
2. on site fuel used		**2. on site fuel used**
Emissions from fossil sources (e.g.)		Emissions from fossil sources: emissions for extraction, refinery and transport of the fuel
• Tractors, forklifts, harvesting machinery		• Fuel used in rented or leased machinery (tractors, forklifts, harvesting, bottling…)
• Bottling machinery		• Fuel used by contractor in vineyard operations
• fuels used in boilers and fixed machineries (if direct control)		
Emissions from biomass and biofuels (according to LCA approach)		Emissions from biomass and biofuels (according to LCA approach)
• emissions for production and transport of the biofuel (if the process, machinery and vehicle are under company ownership or control)		• emissions for production and transport of the biofuel (if not under company control)
• do not include emission from combustion of biofuels		
		Electricity production in situ (for example photovoltaic panels)
		Secondary boundaries
		3. Production of purchased grapes, musts and wines

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		If the winery does not control the production system and/or if it is not possible to know emissions of viticultural or vinification production chain of third parties (suppliers), a representative emission coefficient must be applied per unit purchased
3. Waste disposal, reuse and recycling in the company		**4. Waste disposal, reuse and recycling**
Waste disposal		**Waste disposal**
Aerobic waste treatment both solid and liquid of vitivinicultural origin, if previously accounted as biomass carbon sequestration	Energy consumed in the disposal (if inside the company boundaries and control)	Energy consumed in the disposal (if outside the company)
Onsite waste disposal (anaerobic digestion or incineration)		
CH_4 emissions within waste systems (landfills without gas recovery) (if direct control)		CH_4 emissions within waste systems (landfills without gas recovery) (if outside company boundaries)
Emissions of GHG other than CO2 related to the use and degradation of biomass (if carbon sequestration in biomass is accounted)		
Fuel consumed in the disposal (if inside the company boundaries and control)		
Direct reuse		
If reuse of wine by-products or waste inside the company boundaries. Emitted CH_4 and N_20 have to be accounted (if under company control)		
Recycling (Recycling of wine by-products or waste)		**Energy consumed during recycling**
4. Emissions related to cooling and refrigerating systems		**5. Emissions related to the utilisation of Infrastructure and machinery (annual quota of amortization should be divided as life period of the equipment or the structure). For example:**
• Fugitive gaz of cooling systems (refrigeration, air conditioners, etc...)		**• Machineries**
• Dry ice		Tractors
		Harvesters
		Metal tanks
		Pipes
		Pumps

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		Wine making equipment (press machine, filters, bottling line)
		vineyard posts and wires
5. Transport		**6. Transport**
• **Movement of product** (if transport vehicle under company ownership or control)		• **Movement of product on behalf of third parties** (if transport vehicle is not under company ownership or control)
Transport activities during the wine making process (inputs, products)		
Transport of the wine from the winery to the customer or the consumer		Transport of the wine from the winery to the customer or the consumer
Transport of waste, residues or by-products (grape marc, pruned canes, etc...°		Transport of waste, residues or by-products (grape marc, pruned canes, etc...°
• **Movement of people**		• **Movement of people**
Business travel (if using company's transport)		Business travel (if using transport not owned or controlled by the company)
		7. Inputs (e.g.)
		Fertilisers
		Phytosanitary products
		Water for irrigation purposes
		Yeast and bacteria
		Oenological aids
		Wine additives
		Bottles and containers
		• Glass
		• PET
		• Laminate packaging
		• Aluminium cans
		• Wine bags
		Closures
		• Aluminium screw caps
		• Natural cork

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		• Agglomerate cork
		• Glass stoppers
		• Synthetic corks
		Label
		Packaging products
		Wooden products (pallets)
		Plastic films
		Paper for brochures, posters, publications
		Purchased consumables
		Energy for the storage and use of inputs (if indirect control, ex. in other sites)
STOCKAGE (optional to calculate)	**STOCKAGE (optional to calculate)**	**STOCKAGE (optional to calculate**
		Primary boundaries
1. Vineyard	N/A	**1. Infrastructure**
Non permanent vine growth (SHORT TERM CYCLE)		Oak barrels
Grape growth (SHORT TERM CYCLE)		Vineyard wood posts
Carbon sink of vine structures in the soil (ST CYCLE)		Wood infrastructures (low contributions, may be excluded from the Protocol)
Permanent and incremental stock or loss of carbon due to vineyard and soil management (LONG TERM CYCLE)		
2. Other		
Agro ecological infrastructure related to the vineyard (only if managed or owned by the company[1]).		
Sequestration of carbon emissions arising from fermentation		

NOTE: Are excluded from GHG accounting for the purposes of the OIV GHG protocol the following emissions :

SCOPE 1

Direct greenhouse gas emissions (primary boundaries)

6. Energy and on site fuel used

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- Emissions from biomass and biofuels: Exclude emissions arising from biogenic carbon component when carbon component of the fuel is not made from vine
- CH_4 combustion from waste: no GHG are accounted if CH_4 is derived from biogenic component of the waste

7. Transport

Movement of people

- Travels of employees to their place of work within the company
- Communication of actions undertaken by the company in order to reduce the GHG emissions related to the travel of employees to the place of work
- Transport of consumer to and from the point of retail purchase

B. Product protocol

1. Constructing a GHG footprint calculation for a product

Definition of the carbon footprint in the vitivinicultural sector:

Carbon footprint of a product is a sum of GHG emissions and removals in a product system, expressed as CO_2 equivalent.

Product life cycle in the vitivinicultural sector:

The following product life phases are considered for viticultural products covered by the OIC GHG protocol (resolution CST 431-2011):

Wine or special wine	**Grape** **Fresh grape or raisins for human consumption**
• Grape production	• Grape production
• Wine processing and packaging	• Packaging and conditioning
• Distribution and retail	• Distribution and retail

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• End-life-phase (including use phase), covering disposal and recycling	• End-life-phase (including use phase), covering disposal and recycling

Emissions arising during consumption phase are not included in the carbon footprint of a viticultural product.

Functional unit

Functional unit for the purposes of the carbon footprint of a vitivinicultural product is:)

Wine and special wine : 0.75L (or other sizes according to the purpose of the study)

Grapes or rasins : 1 kg

Definition of product boundaries

"Cradle-to-grave" approach should be adopted

Boundaries should be clearly defined according to the objectives set up by the company and adequately communicated.

Partial CFP, with partial number of stages can be conducted (for business decision making), provided that they are clearly identified and adequately disclosed.

2. Inventory of GHG emissions and sequestrations during the phases of the product life cycle in the vitivinicultural sector

The following table (table 3) presents the inventory of processes which should be taken into account for the calculation of carbon footprint of the vitivinicultural products.

Table 3 Inventory of GHG emissions and sequestrations during the phases of the product life cycle in the wine production

	Grape production	Wine processing	Distribution and retail	End-life-phase (including use phase, covering disposal and recycling)
1. Vineyard				
Land use change (conversion to a vineyard)	√			

	Grape production	Wine processing	Distribution and retail	End-life-phase (including use phase, covering disposal and recycling)
Training and trellising systems phase (years amortisation recalculated quota according to the expected lifetime of the vineyards).	√			
Biodegradation of vine structures in the soil) only in Short term cycle), if accounted also as biomass carbon sequestration	√			
N_20 and CH_4 emissions resulting from nitrogen fertilisation of the soil	√			
2. Energy and on site fuel used				
Emissions from fossil sources				
• Tractors, forklifts, harvesting machinery	√	√		
• Bottling machinery		√		
• Energy for the storage and use of inputs (if direct control)	√	√	√	√
Emissions from biofuels (not from combustion of biofuels)				
• Include emissions from transport of the biofuel	√	√	√	√
• Include emissions from production of the fuel	√	√	√	√
3. Waste disposal, reuse and recycling				
Waste disposal				
Aerobic waste treatment both solid and liquid of vitivinicultural origin	√	√		√
Onsite waste disposal (anaerobic digestion or incineration)	√	√		√
CH_4 emissions within waste systems (landfills without gas recovery)	√	√		√
Emissions of GHG other than CO_2 related to the use and degradation of biomass	√	√		

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	Grape production	Wine processing	Distribution and retail	End-life-phase (including use phase, covering disposal and recycling)
Energy consumed in the disposal (if inside the company boundaries)	√	√	√	√
CO_2 emissions from waste water	√	√	√	√
Direct reuse				
If reuse of wine by-products or waste inside the company boundaries, only if CH_4 and N_2O are present. Examples:	√	√		
• Pruned canes ground for soil amendment	√	√		
• Preparation and burning of wood residues or grape marc for energy purposes	√	√		
• Compost preparation	√	√		
• Distillation of wine or grape marc		√		
4. Emissions related the utilisation of machineries and Infrastructure if they are significant (e.g.)				
Tractors	√			
Wires	√			
Harvesters	√			
Metal tanks		√		
Pipes		√		
CO_2 for pipe flushing		√		
Pumps		√		
Wine making equipment (press machine, filters, bottling line)		√		
• fugitive Gaz of cooling systems (refrigeration, air conditioners, etc…)		√		
• Dry ice, blanket tanks		√		

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	Grape production	Wine processing	Distribution and retail	End-life-phase (including use phase, covering disposal and recycling)
Oak barrels		√		
• Cleaning		√		
• Transport		√		
Forklifts	√	√	√	√
5. Emissions related to the production of infrastructure and machinery (years amortisation recalculated quota according to the expected lifetime, **if they are significant).**				
Repair and maintenance of machineries and infrastructure items	√	√	√	√
Tractors	√			
Harvesters	√			
Metal tanks		√		
Pipes		√		
Pumps		√		
Wine making equipment (press machine, filters, bottling line)		√		
vineyard wooden posts	√			
6. Production of inputs. (All inputs used for the product object analysed. For example:				
Fertilisers	√			
Phytosanitary products	√			
Water for irrigation purposes	√			
Yeast and bacteria		√		
Oenological aids		√		
Wine additives		√		

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	Grape production	Wine processing	Distribution and retail	End-life-phase (including use phase, covering disposal and recycling)
Heat-transfer gases		√		
Bottles and containers			√	
• Glass			√	
• PET			√	
• Laminate packaging			√	
• Aluminium cans			√	
• Wine bags			√	
Closures			√	
• Aluminium screw caps			√	
• Natural cork			√	
• Agglomerate cork			√	
• Glass stoppers			√	
• Synthetic corks			√	
Label			√	
Packaging products	√	√	√	
Wooden products (pallets)	√	√	√	
Plastic films	√	√	√	
Paper for brochures, posters, publications	√	√	√	
Purchased consumables				
7. Transport				
• Movement of products				
Transport of inputs	√	√		
Transport activities during the wine making process		√		

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	Grape production	Wine processing	Distribution and retail	End-life-phase (including use phase, covering disposal and recycling)
Transport of the wine from the winery to the customer or the consumer			√	
Transport of waste or residues to a disposal centre				√
Transport of by-products (pruned canes, grape marc ...) – if under direct responsibility of the company	√	√		
Transport to recycling centre				
• Movement of people Business travel (if using company's transport)	√	√	√	
8. Use phase				√
9. Disposal. It is to consider the end of life of products and packaging				√

III. Quantification process

Quantification shall include all GHG emissions and removals arising from the unit process identified.

The following assessments should be made before initiating the quantification process:

- Which unit process need detailed assessment due to a significant expected contribution?
- Which process may be merged due to similar nature of contribution (ex.: transport activities)
- Which unit process may need to rely on secondary data (collection of primary data is not possible or practical?)

[Methodologies and emission factors used in the calculation of GHG emissions must

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come from a recognized source]

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[1] Gianelle, D; L. Gristina; A. Pitacco; D.Spano; T. La Mantia; S. Marras; F. Meggio; A. Novara;C. Sirca and M. Sottocornola (2015). “The Role of Vineyards in the Carbon Balance Throughout Italy”Chapter.11. Springer-Verlag Berlin Heidelberg. R. Valentini and F. Miglietta (eds.), *The Greenhouse Gas Balance of Italy, Environmental Science and Engineering*, 159-171. DOI 10.1007/978-3-642-32424-6_11.

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