ENVIRONMENTAL **PRODUCT** DECLARATION

ZEUS KIWI S.A. Kiwifruit

EPD®
ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025

EPD Registration Number	Publication Date	Revision Date	Program	Program operator	UN CPC
S-P-00310	03/01/2012	22/03/2022 Date of Validity 21/11/2026	The International EPD® System www.environdec.com	EPD International AB	01352 – Kiwi fruit

CONTACT INFORMATION

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PROGRAM RELATED INFORMATION

Product group classification: UN CPC 01352

Product Category Rules: PCR Fruits and Nuts; Version 1.01; 2019-08-18

PCR review was conducted by

The Technical Committee of the International EPD® System.

Independent third-party verification of the declaration and data

in accordance with ISO 14025:2006

☐ EPD process certification ☑ EPD verification

Procedure for follow-up during EPD validity involves third party verifier

☑ Yes ☐ No

The EPD owner has the sole ownership, liability and responsibility of the EPD.

COMPANY INFORMATION

ZEUS KIWI S.A. is a Producer Organization at the vanguard of production, maintenance and distribution of kiwi fruit and seedless grapes. Known and respected worldwide for its high quality and pleasant taste, the secret of excellence lies in the idyllic soil and climatic conditions of the area as well as sustainable growing practices. Zeus growers number more than 300 and their aim is to spearhead the expansion of their cultivation with new varieties of kiwi and the further cultivation of vines of the most coveted varieties.

ZEUS KIWI S.A. was founded in 1991. It was funded by 99 growers from the Pieria Prefecture who were its first shareholders. Located at the Municipal department of Karitsa in the Municipality of Dion, at the foothills of Mount Olympus, Zeus Kiwi is a vertical organization which grows, collects, maintains, pack and exports fresh products. In 1997, Zeus Kiwi was the 1st Producer Organization in Greece to be recognized by the Ministry of Agriculture under the European Union Regulation 2200/96.

PROTECTED GEOGRAPHICAL INDICATION (PGI)

Under the 6/39/05.03.07 decision of the Greek Ministry of Agriculture, ZEUS KIWI S.A. produces and exports kiwi fruits of Protected Geographical Indication (PGI). The EU sign pf PGI applies to all kiwis grown in the region of Pieria and exported by ZEUS KIWI, adding extra quality value on the product.

QUALITY & ENVIRONMENTAL POLICY

ZEUS KIWI S.A. has applied advanced quality systems since 1993, being the first organization in Greece to be certified according to the rules of Integrated Crop Management by Agrocert (Agro 2.1-2.2) of the Greek Ministry of Agriculture. As Agro 2.1 is an adaption of ISO 14001 to Greek agriculture, ZEUS KIWI is implementing an Environmental Management System (EMS) which is specific to agriculture, with a strict policy oriented to adherence to legal obligations, to prevention and reduction of GHG emissions and pollutions, and to preserving biodiversity.

ZEUS KIWI S.A. environmental concerns and responsibility are expressed through the reduction of use of agrochemicals by means of Integrated Pest Management based on monitoring and continuous scouting through the orchards. They are also demonstrated by participating in local schemes for prevention of pollution through recycling of packaging material.

In fact, ZEUS KIWI S.A. actively contributed to formulating the protocol of ICM in these lines with Agrocert, for the Greek Ministry of Agriculture. In addition to the EMS, ZEUS KIWI implements: BRC, ISO 9001:2006, Globalgap, HACCP, and an effective traceability system with the use of bar code method.

COMPANY INFORMATION

ZEUS KIWI S.A. international presence and exports have always been strategic priority. During the last years, ZEUS KIWI has established a dynamic international presence in more than 30 countries globally.

ZEUS KIWI S.A. is an export company primarily supplying the European Union, UK, China, South East Asia, USA, Canada, South America, etc. Almost 85% of the kiwi's production goes to super-markets, with about 60% exported to the UK super-markets including Asda (Wal-Mart), Marks and Spencer, and Wailtrose and Delhaize of Belgium. e number 350 member-growers of kiwifruit, seedless grapes and apricots in a growing area of 420 Ha. All our growers are dedicated members, following strict growing practices put in place by ZEUS over almost 30 years, a fact that enables us to have an excellent knowledge of their fruit quality.
ZEUS KIWI SA is a multi shareholding company, with our growers being shareholders, and is one of the largest growers of kiwifruit in Greece. We have more than 25 years experience meeting the demands of supermarkets around the globe. Since its early days, ZEUS has been totally dedicated to growing fresh produce to high quality standards, with the preservation of natural resources always a major goal.

SPECIALIZATION

The state-of-the-art equipment used at ZEUS KIWI, the highly trained and specialist work force, and the close supervision of production from the field to the retailer guarantee the top quality that even the most demanding of today's consumer rightly expects. We at ZEUS are at the vanguard in every facet of modern production, sorting and packing methods in our ultra modern facility.

Every year ZEUS KIWI invests in updating and training its professional workforce in all new developments relevant to our field of work. By participating in all major seminars and exhibitions in Greece and abroad, our managers have acquired the experience necessary for maintaining the high quality and safety of our products. The close co-operation with Universities, Institutes and Horticultural establishments all over the world enables ZEUS to constantly improve and develop our range of products.

MARKETING OF KIWI FRUIT

This EPD presents the environmental impact of ZEUS kiwifruit exclusively produced by the registered kiwi growers of ZEUS KIWI. Kiwifruit marketed under this EPD will bear the following mark.

WHAT MAKES US DIFFERENT

ZEUS KIWI S.A. adds value in local partnerships, making use of its products, equipment, know-how and expertise and contributing to initiatives related to its priorities, including public Health and Safety, education, environment and local infrastructure projects. ZEUS orchards contribute significantly through their operation to viable growth and to the economic and social development of local communities.

ZEUS KIWIFRUIT

PRODUCT DESCRIPTION

ZEUS KIWI S.A. kiwifruit is a new food in western diet, originating from China. Its consumption expanded rapidly due to its delicious taste and its nutritional value as it is rich in vitamins C and K, is high in dietary fiber and is also a good source of potassium. It is well known that Vitamin C contributes to the protection of cells from the oxidative stress. On the other hand, Vitamin K contributes to the maintenance of normal bones and the consumption of pectin (the soluble part of dietary fiber) contributes to the normal blood cholesterol levels in the context of a varied and balanced diet and a healthy lifestyle.

CONTENT DECLARATION

No substances included in the Candidate List of Substances of Very High Concern for authorization under the REACH Regulations that exceed 0.1% of the total weight are present in ZEUS kiwifruit. Also, no additional chemicals are used by ZEUS for post-harvest treatment of kiwifruits. of dietary fiber) contributes to the normal blood cholesterol levels in the context of a varied and balanced diet and a healthy lifestyle.

Kiwifruit raw (100 gr)**	Value	Kiwifruit raw (100 gr)**	Value
Energy	61 kcal	Dietary fibres	3.41 gr (14% RDA)
Protein	1 gr	Dietary fibres of which pectin	0.8 gr
Carbohydrates	14.66 gr	Sodium	3 gr
Of which Sugars	8.99 gr	Vitamin C	92.7 mg
Total lipid (fat)	0.52 gr	Vitamin K	40.3 mcg
Of which saturated fat	0 gr	Potassium	312 mg
Cholesterol	0 mg		

Kiwifruit	
Color	Skin color – Light brown / Felsh color – Bright green with edible black seeds
Shape	Oval
Flesh	Soft texture
Taste	Typical sweet
Mass	70-130 gr
General Characteristics	Very rich in Vitamin C and fibres

For further information, details and/ or explanation, please contact info@zeuskiwi.gr

LIFE CYCLE ASSESSMENT
INFORMATION

DECLARED UNIT

The declared unit is 1 kg of Kiwifruit (inclusive of peel) eaten by the consumer. Packaging material of the distributed kiwifruit is included, but packaging weight is not considered within the 1 kg of the declared unit.

SYSTEM BOUNDARY

This EPD follows a "Cradle-to-grave" approach, meaning that all modules of the full product Life Cycle are taken into consideration and define the framework of the system boundaries. Thus, Life Cycle stages that include Upstream processes (from-cradle-to-gate), Core processes (from-gate-to-gate) and Downstream processes (from-gate-to-grave), are reported.

REFERENCE PERIOD

This EPD refers to 2020 harvest.
Agricultural phase: January 2020 – September 2020
Production process phase: October 2020 – April 2021

GEOGRAPHICAL SCOPE

Global

PHASES OF KIWI PRODUCTION

UPSTREAM

- Production of raw materials, fuel and energy.
- Consumption of water resources.

CORE

- Emissions related to the use of diesel, fertilizer and agricultural chemicals during the farming phase.
- Emissions related to the use of fuels and electricity during the packing house phase.

DOWNSTREAM

- Distribution.
- Use phase.
- End-of-Life phase.
- Waste Treatment.

EPD TYPE

Specific, only for ZEUS Kiwifruit

SOFTWARE

GaBi ts version 10.5.1.124

DATABASE

Ecoinvent 3.7.1 & Professional 2021

LIFE CYCLE ASSESSMENT
INFORMATION

UPSTREAM PROCESSES

- Electricity production
- Agrochemicals production
- Packaging production
- Fuels production
- Seedlings production

CORE PROCESSES

- Field Phase Operations
- Packing House activities
- Storage & Cooling

DOWNSTREAM PROCESSES

- Transportation to Retail
- Use phase
- End-of-Life

LIFE CYCLE ASSESSMENT
INFORMATION

CUT-OFF CRITERIA

All raw materials and consumable item inputs, associated transportations as well as process energy and water use, are included in the LCA study. Life Cycle Inventory data for a minimum of 99% of total flows (mass and energy) to the upstream, core and downstream modules are being included. However, it is assumed that the total neglected input flows are much less than 1% of total energy and mass. All associated processes specific data are determined and modelled by the use of generic data provided by the integrated GaBi databases. Flows that have been excluded from the modelling of the studied system are:

- Production of cultivation materials, agricultural tools and insect traps.
- Production and maintenance of irrigation installations.
- Processes regarding land levelling, soil loosening, ridge and trellis formation.
- Waste treatment of the empty containers of plant protection products.
- Wastewater treatment due to kiwi fruit consumption.
- Production of HDPE crates used during harvesting period.

DIFFERENCES VERSUS PREVIOUS VERSION

The most noticeable differentiation in comparison to the previous version is the improvement of the national electricity grid mix. Also, technology improvements in agrochemicals production are considered within the changes.

BACKGROUND DATA AND DATA QUALITY

For all processes primary data was collected and provided by ZEUS KIWI S.A. Data related to material and energy flows of the defined system, are acquired from the company developing the EPD and data related to life cycle impacts result from calculations based on databases and characterization factors.
The LCA software GaBi ts version 10.5.1.124 was used for inventory and impact assessment calculations based on data entry of the developed model. A compilation of Ecoinvent v.3.7.1 and Professional 2021 databases was used. All background data are no more than 10 years old.
Core Life Cycle stage has a reasonably good data coverage since the majority of data used were specific data monitored and collected through the collaborative efforts of ZEUS KIWI S.A. and its farmers

ASSUMPTIONS, ALLOCATION, AND ESTIMATES

- Regarding the exclusion of product life cycle stages and processes, the use, end-of-life, and reuse stage have not been accounted for. Also, the capital goods (construction of the site) are not included in this LCA study.
- ZEUS KIWI S.A. kiwifruit production and marketing renders no co-products. Thus, there is no need for allocation in this specific process.
- Since re-establishment of plantation is required every 30 years, the Life Cycle stage that is associated with the installation of a kiwi orchard in not considered within the scope of this LCA study.
- The operation of agricultural machinery (tractors) has been allocated to kiwifruit production proportionally to its use on the kiwi orchards.
- No potential repacking at the retailing outlets or grocery stores is occurred.
- Treatment of fertilizers' packaging waste as occurred from fertilizers application was conducted through recycling and landfill.
- The use of electricity at the packing house for October and November is allocated according to kiwifruit occupation volumes at the cooling chambers.

ENVIRONMENTAL PERFORMANCE
INDICATORS

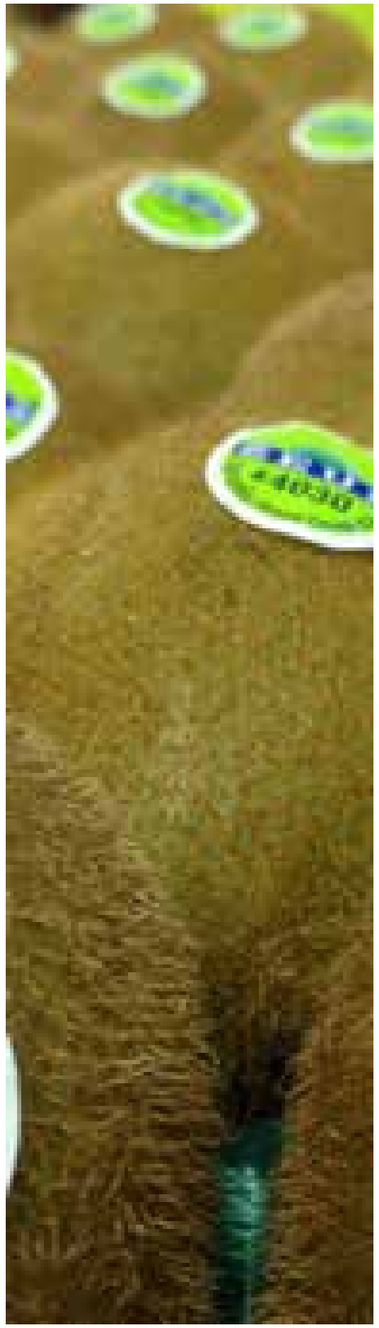
PARAMETERS DESCRIBING THE ENVIRONMENTAL IMPACTS

The following tables present the environmental impact potentials for different parameters, for the material flows as well as for the waste and other outputs. The results refer to 1 kg of ZEUS Kiwifruit.

ENVIRONMENTAL IMPACT CATEGORIES		Impact/ 1 kg ZEUS Kiwifruit			
		UPSTREAM	CORE	DOWNSTREAM	TOTAL
Global Warming Potential (GWP100) – fossil	kg CO2 eq.	0.423	0.175	0.042	0.641
Global Warming Potential (GWP100) – biogenic	kg CO2 eq.	-0.033	-0.016	0.174	0.125
Global Warming Potential (GWP100) – land use and land use transformation	kg CO2 eq.	2.809E-04	6.477E-04	3.385E-04	1.267E-03
Global Warming Potential (GWP100) – TOTAL	kg CO2 eq.	0.391	0.159	0.216	0.766
Acidification Potential	kg SO2 eq.	6.068E-04	1.447E-03	2.695E-04	2.323E-03
Eutrophication Potential	kg PO4-3 eq.	2.837E-05	1.784E-04	3.804E-07	2.071E-04
Photochemical Oxidant Formation Potential	kg NMVOC eq.	6.258E-04	2.246E-03	6.882E-04	3.560E-03
Depletion of abiotic resources (elements)	kg Sb eq.	1.009E-07	3.257E-07	6.378E-09	4.330E-07
Depletion of abiotic resources (fossil)	MJ net calorific value	7.225	3.944	0.391	11.559
Water scarcity potential	m3 eq.	11.656	0.044	0.032	11.732

ENVIRONMENTAL PERFORMANCE
INDICATORS

USE OF RESOURCES		Impact/ 1 kg ZEUS Kiwifruit			
		UPSTREAM	CORE	DOWNSTREAM	TOTAL
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ, net calorific value	2.210	0.399	0.018	2.627
Use of renewable primary energy resources used as raw materials	MJ, net calorific value	-	-	-	-
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ, net calorific value	2.210	0.399	0.018	2.627
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ, net calorific value	7.178	3.944	0.391	11.513
Use of non-renewable primary energy resources used as raw materials	MJ, net calorific value	-	-	-	-
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ, net calorific value	7.178	3.944	0.391	11.513
Use of secondary material	kg	-	-	-	-
Use of renewable secondary fuels	MJ, net calorific value	-	-	-	-
Use of non-renewable secondary fuels	MJ, net calorific value	-	-	-	-
Use of net fresh water	m3	0.271	1.032E-03	7.487E-04	0.273



ENVIRONMENTAL PERFORMANCE
INDICATORS

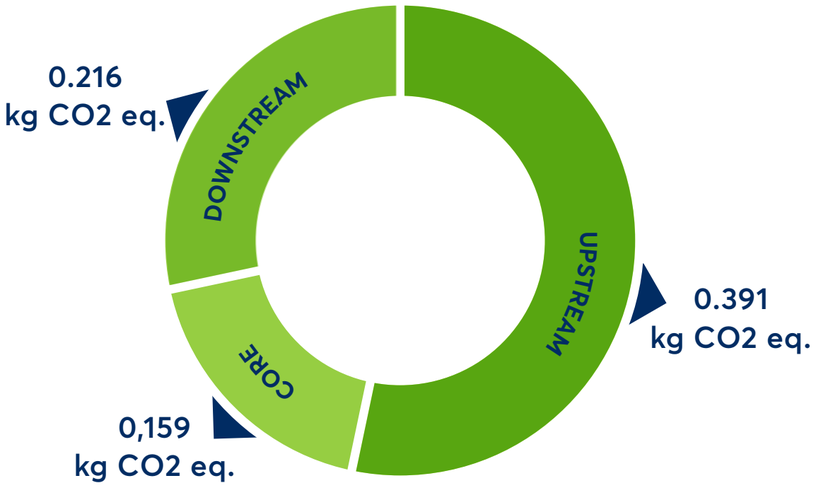
WASTE PRODUCTION		Impact/ 1 kg ZEUS Kiwifruit			
		UPSTREAM	CORE	DOWNSTREAM	TOTAL
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ, net calorific value	1.960E-09	1.687E-11	5.350E-11	2.030E-09
Use of renewable primary energy resources used as raw materials	MJ, net calorific value	0.079	8.561E-04	9.506E-04	0.081
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ, net calorific value	1.523E-04	4.113E-07	-4.163E-05	1.111E-04

OUTPUT FLOWS		Impact/ 1 kg ZEUS Kiwifruit			
		UPSTREAM	CORE	DOWNSTREAM	TOTAL
Components for re-use	kg	-	-	-	-
Materials for recycling	kg	-	-	0.026	0.026
Materials for energy recovery	kg	-	-	-	-
Exported energy, electricity	MJ per energy carrier	-	-	-	-
Exported energy, thermal	MJ per energy carrier	-	-	-	-

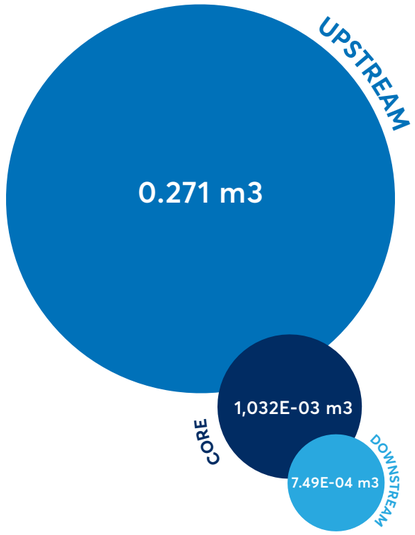
INTERPRETATION

ZEUS KIWIFRUIT

Global Warming Potential - total
kg CO2 eq. per kg of product



Net Use of Fresh Water
m3 per kg of product



The majority of the environmental impact categories is mainly dominant by the Core Module, whereas Global Warming Potential – total and Depletion of abiotic resources – fossil are highly influenced by the Upstream Module. Water Scarcity Potential is entirely affected by the Upstream Module.

Global Warming Potential – total of 1 kg ZEUS Kiwifruit is dominated by 51% by the Upstream module. Core and Downstream Modules contribute equally to the formation of the impact category.

Due to the fact that Greek residual electricity mix demonstrates an increasingly share derived from renewable sources, the environmental impact of electricity is reduced in comparison to electricity impact of previous years and does not influence severely the formation of the impact categories.

Acidification Potential (AP) is mainly influenced by Core Module. More specifically, Upstream Module is accounted for 26% of the impact, whereas Core Module influences the total impact indicator more than 60%.

A slightly similar pattern is followed regarding the formation of Eutrophication Potential (EP). Upstream Module is responsible for the contribution of 14% of the total impact, where contributions from Core Module are still the most dominant, with a significant contribution of 86%.

REFERENCES

- International EPD® System, General Program Instructions for the International EPD System, version 4.0
- International EPD® System, PCR Fruits and Nuts 2019:01, version 1.01
- International Organization for Standardization (ISO), Environmental labels and declarations – Type III environmental declarations – Principles and procedures. ISO 14025:2006
- International Organization for Standardization (ISO), Environmental management – Life Cycle assessment – Principles and framework. ISO 14040:2006
- International Organization for Standardization (ISO), Environmental management – Life Cycle assessment – Requirements and guidelines. ISO 14044:2006
- Environmental Product Declaration for ZEUS Kiwi Fruit – dated 03/01/2012
- The International EPD® System – The International EPD System is a programme for type III environmental declarations, maintaining a system to verify and register EPDs as well as keeping a library of EPDs and PCRs in accordance with ISO 14025. www.environdec.com
- EN ISO 14001 – Environmental Management Systems – Requirements
- ISO 14020 – Environmental Labels and Declarations – General Principles
- Sphera – GaBi Product Sustainability software – www.sphera.com

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