

TARROS GROUP



**SUSTAINABILITY
REPORT**
2023

TARROS
A SHORT SEA
SHIPPING COMPANY

INDEX

Message from the President	5
Message from the CEO.....	7
Introduction.....	9
Tarros Group, a history of innovation.....	11
Timeline	12
Numbers in 2022	15
<i>Methodological notes</i>	16
<i>SDGs and GRI Standards</i>	18
<i>Group organizational structure</i>	19
<i>Agencies of Tarros Group</i>	20
<i>Awards, Certifications and Memberships</i>	22
<i>Top Job - Best Employers 2021</i>	23
<i>Elite Network</i>	23
<i>Our values, our approach to sustainability: group mission and vision</i>	24
<i>Economic performance</i>	24
Sustainable investments.....	27
<i>Sustainability as a guideline to the Group investments</i>	27
Terminal del Golfo	29
<i>Purchase of green technology cranes</i>	29
<i>Smart gate system</i>	30
<i>Lighting at Terminal del Golfo</i>	32
Carbox	33
<i>Pomara hub</i>	33
<i>Carbox fleet renewal</i>	34
<i>Carbox digital transformation</i>	35
Tarros Home: more than just a workplace	37
<i>Digitalization: Tarros Web Evolution</i>	38
Environment.....	39
<i>Tarros Group for the environment</i>	39
· <i>Waste management</i>	39
· <i>Energy management</i>	41
· <i>Short sea shipping valorisation: comparative study of emissions from tarros routes</i>	42
· <i>Simulation between multimodal transport and full truck load transport on Greece, Portugal and Turkey lines</i>	42
· <i>Plastic-free project</i>	44

Social	45
<i>Tarros for Social and the Community</i>	45
· <i>Tarros for Youth</i>	45
· <i>Welfare Policy: Work-Life Balance</i>	45
· <i>Remote and flexible working</i>	46
· <i>Sports sponsorship</i>	47
· <i>WoW project: Wheels on Waves</i>	47
· <i>Tarros and sailing</i>	48
· <i>Sponsorship to Borgata Fossamastra</i>	49
· <i>Tarros Sarzanese Football Team</i>	50
Governance	51
<i>Tarros S.P.A. governance model</i>	51
· <i>Organizational structure</i>	52
· <i>Powers of attorney and proxies</i>	52
· <i>Manual and I.T. procedures</i>	52
· <i>Whistleblowing</i>	54
· <i>Our certifications</i>	54
· <i>Code of ethics</i>	55
Sustainable development goals	59
Annexes	60
<i>Annex 1: GRI KPI datasheet</i>	61
<i>Annex 2: Comparative Study on emissions drawn up by Tecnocreoa</i>	65



MESSAGE FROM THE PRESIDENT

Our Group considers its activity as an instrument connecting the different cultures in the Mediterranean rim, on which Tarros has its roots: our company has been set up on the sea and on the sea has developed its 196-year-old activities.

We have a strong made-in-Italy identity enriched by the Mediterranean basin which has allowed us to develop and adapt over time and the course of history.

For this reason we consider our Sustainability Report as an important step forward to reinforce our vision of a sustainable company for almost two centuries. We believe that companies do not only exist to provide their customers with solutions, but also to contribute to identity building and create social connections and interactions with the territory.

We are proud of our connection with the territory: as highlighted in our Report, we aim at engaging the local community and we consider every town where we operate as our home.

We like thinking that the young people who have grown up looking at the ships sailing with our yellow containers on board, today do work with the same containers. The search for innovation in any sector, the dedication to work along with our passion belong to our tradition.

Alberto Russo



MESSAGE FROM THE CEO

In the last few years sustainability has become an essential value for any company, as a matter of fact no company can't help but recognize the importance of assessing the social and environmental impact of its activities.

In a fast-evolving world and market, in the era of maritime gigantism and post-pandemic society you may feel overwhelmed. In times like these it is important for us to remember the values which have led our company which has been run by the same family since its establishment.

These values shape our activities and are considered with the same attention given to economic performance: with this awareness we have been leading our Group for almost 2 centuries.

Since we designed Tarros Class, the first Ro-Ro cargo ship able to load without container handling equipment we have been fostering innovation, a word that nowadays goes hand in hand with sustainability. We believe that only by supporting innovation we can perform our activities at our best, striving for excellence, and leaving the world in a better state than we found it for the next generation.

Daniela Ricci



INTRODUCTION

Tarros Group has been characterized by the continuity of family leadership in La Spezia for almost two centuries. These two factors, the family business continuity and the large presence in the territory have contributed to make Tarros not only a leading company in the short sea shipping sector, but also a presence of vital importance in the territory. The relationship with the territory where Tarros operates has been built over the years on different fronts: on the one hand the institutions, on the other hand the local community in the spirit of coexistence resulting in social benefits.

All the choices and investments of the Group over the years have been made based on this awareness in order to achieve cross-cutting goals in our community and in the environment which are not directly related to our business. For these reasons, when we started drafting this report, we all agreed that it shall represent the sustainability vision that the Group has been fostering as part of its values throughout its history. In this regard, we think that this Report of Sustainability represents an opportunity for our group to highlight its entrepreneurial vision according to which the well-being of each colleague represents an indicator as important as any other key performance indicator.

In this report we are going to analyse how the Group has implemented its sustainability vision in its core business and its corporate mission. We will start with a short methodological note taking into account the historical context so as to collocate the Group in two centuries of history and determine the origin of its own values. Then we will show the Group sociogram which has been used while drawing up this report. A large section of this report will be dedicated to the Group sustainable investments made until 2022, the report temporal scope. There will be a section relative to the Group commitments to environmental issues within its competence and a section regarding social sustainability. We consider the last section regarding the sustainable development goals we want to achieve as the most relevant: the main characteristic of these goals, as it will be clearly highlighted, is their connection with the path the Group has taken.

In conclusion, the key word of our approach is continuity: we keep moving forward setting sustainability goals consistent with the strong identity which has distinguished our 200-year-old history.



KONECRANES
GOTTWALD

ESP.8

since
1828
www.tarros.it



TDG
TERMINAL DEL GOLFO

TARROS GROUP, A HISTORY OF INNOVATION

Tarros Group is the first Italian company to have transported 33 containers around the Mediterranean Sea on the ship called Vento del Golfo which had been specifically modified in 1967. Today the Group, thanks to its network, continues to support innovation and eco-efficiency, providing its customers with the best solutions, such as the creation of the new Tarros Certified Container, a type of container which before being delivered to the customer must pass strict controls. The Group is able to put 20 different container types on the market plus one: the container which is created according to specific customer needs.

For Tarros Group the concept of sustainability goes along with efficient and effective behaviour. For this reason, the Group considers the management of the fleet based on service needs and the changing market conditions as a top priority. In order to ensure the best service with the least number of ships the Group has decided to optimize sea transport, a way of transport with the least environmental impact, availing itself of container ships.

Along with the expansion of services over the years Tarros has built partnerships with local operators in all the countries reached by its ships, in this way creating a Euro-Mediterranean network among Tarros Companies which widely and directly control every stage of the logistics chain.

An important investment has been made to develop the Libyan shipping route which has been connecting the port of La Spezia to the main Libyan ports since 1975. Moreover, the new regulation on sulphur emissions in sea transport decreasing the sulphur limit from 3.5% to 0.5% starting from 1st January 2020 represents a big step forward.

Thanks to this international network the Group is able to provide customized services to meet customer needs and has always based its development on innovation, passion and respect of the territory where its companies operate.

TIMELINE

Fondata nel 1828 come M.A. Grendi, queste le tappe principali dell'evoluzione della Società:

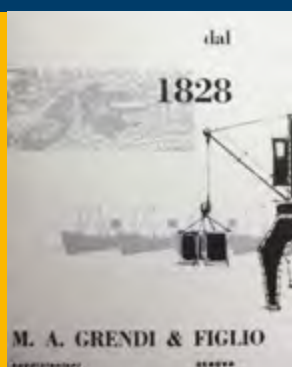
1800

1960

1970

1980

1990



1828

FOUNDATION OF
TARROS COMPANY
AS **M.A. GRENDI**

1890

The **MUSO** family starts
with Marco Antonio Musso



1963

ESTABLISHMENT
OF **TARROS SPA**

1967

Tarros launches the first
container service in
the Mediterranean sea:
the regular
Genoa-Sardinia line
begins with the
container ship

VENTO DEL GOLFO

1969

FEBRUARY

Launch of the first
cellular container ship,
**VENTO DI
TRAMONTANA**:
the first of a series
of ships named
TARROS CLASS
worldwide

APRIL

The start of the first
international Tarros
container line from
Venice to Piraeus



1971

Transfer
of the company from
Genoa to La Spezia



Establishment of
**NORA
CONTAINERS SPA**
specialized in storage,
repair and maintenance
of containers

1988

CONSTITUTION OF
**TARROS TUNISIE
AGENCY**

1989

CONSTRUCTION OF THE
NEW RO-RO PIER
at Pagliari
and the purchase
of the *Demolition
Shipyards of the Gulf*



1993

**"TERMINAL
DEL GOLFO"**
starts operating
in La Spezia

1998

CONSTITUTION OF **CMS**
Maritime Service Agency

1999

CONSTITUTION OF
**TARROS ALGERIE,
TARROS HELLAS**
and **TARROS UK
AGENCIES**

2000



CREATION OF **CARBOX**
for land transport management

2001

SEPTEMBER
CONSTITUTION
NAUTICAL OF THE GULF
specialized in maintenance,
renovation and storage of cruisers

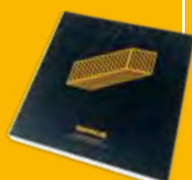
OCTOBER
CONSTITUTION OF
TARROS
SUD-NAPLES

2006/07

CONSTITUTION OF
AGENCIES:
TARROS MAROC
TARROS LYBIA
and **TARROS**
EXPRESS EGYPT

2008

180TH TARROS' S
ANNIVERSARY



2010



TARROS OBTAINS
ISO 14001
certifications in Environmental
Management
and **OHSAS 18001**
in regards to Safety and Health
Management of Employees

DECEMBER
Constitution of
**MASTER PROJECTS
& LOGISTICS**
a maritime agency
able to offer services
in synergy with
the Tarros Group

2013

CONSTITUTION OF
TARROS PORTUGAL
AGENCY

2015

TARROS OBTAINS
AEO CERTIFICATION
of reliability and solvency

2019



NEW PAYOFF
**mediterranean
LOGISTICS
SOLUTIONS**



15 JUNE
OPENING THE
OPERATING BASE FOR
MASERATI MULTI 70

15 OCTOBER
PRESENTATION OF
**TARROS CERTIFIED
CONTAINER**



15 NOVEMBER
Tarros Group is on board with
AMBROGIO BECCARIA,
winner of
Mini-Transat 2019

28 NOVEMBER
10TH ANNIVERSARY
TARROS IN PORTUGAL

2020



JANUARY
RENOVATION OF IDEAS
FOR **TARROS HOME**



FEBRUARY
OPENING OF OUR
NEW OFFICE IN **GENOA**

JUNE
**20TH ANNIVERSARY
OF CARBOX**



JULY
OPENING OF OUR
NEW OFFICE IN **NAPLES**

SEPTEMBER
OPENING OF OUR
NEW OFFICE IN **VENICE**

DECEMBER
Tarros Group is awarded as
**TOP JOB BEST
EMPLOYERS 2021**



2021



JANUARY
THE START OF
**TARROS WORLD
PROJECT**



MARCH
NEW DESIGN FOR
CARBOX TRUCKS

JUNE
Start up for the design of
new **TARROS GROUP
OFFICES**

2022

JUNE
INITIATION OF THE
BUILDING OF THE NEW
**TARROS GROUP
OFFICES**





NUMBERS IN 2022



METHODOLOGICAL NOTES

The graph below shows the reporting boundary adopted when preparing the Sustainability Report and considers:

all the companies fully consolidated by Tarros Group, apart from those placed in liquidation on 31st December 2022, dormant, discontinued or held for sale;

companies which are not fully consolidated, but are considered significant – due to the shares held, their business and governance - for the purpose of properly representing the Group activities, about which both qualitative and quantitative information is provided.

The sociogram below represents the reporting boundary used in this document:



In order to ensure reliability of the information herein, directly measurable indicators are used, avoiding the use of estimates as much as possible. Estimates are indicated as such. Calculations are based on the best available information or on sample surveys. This report has been drawn up by Tarros Group sustainability department and does not have any external assurance.

The decision to create a department for sustainability is the result of a process implemented within the Group. The in-house management of the Group sustainability report has allowed to get a broader vision of the most relevant issues as well as to identify the key performance indicators (KPIs) to pursue an improvement strategy aimed at constantly improving ESG performance.



SDGs AND GRI STANDARDS

As regards compliance of Tarros Group sustainability strategy with the main international standards, this report takes into account the data and the performances in the years 2021 and 2022 according to the KPIs provided by the Global Reporting Initiative (GRI) Standards. This Report has been prepared in compliance with the Global Reporting Initiative (GRI) Standards and the “In accordance - Core” option.

The GRI Standards are the most widely used international standards in non-financial reporting.

Moreover, Tarros Group activities meet the Sustainable Development Goals (SDGs) set by the United Nations in the 2030 Agenda with its 17 SDGs and relative targets.



In 2015 the 193 member states of the United Nations set 17 Goals for sustainable development and 169 associated targets as part of the 2030 Agenda, a universal call to action embracing the following fundamental principles: people, planet, prosperity, peace and partnership. In this context, Tarros Group is committed to reach the most relevant Sustainable Development Goals (SDGs), i.e. no. 3, 4, 5, 8, 9, 10, 11, 13, 14.

As regards the application of the KPIs provided by the GRI standards, we think that the GRI standards to comply with, where applicable, are GRI 101, GRI 102, GRI 200, GRI 300; GRI 400.

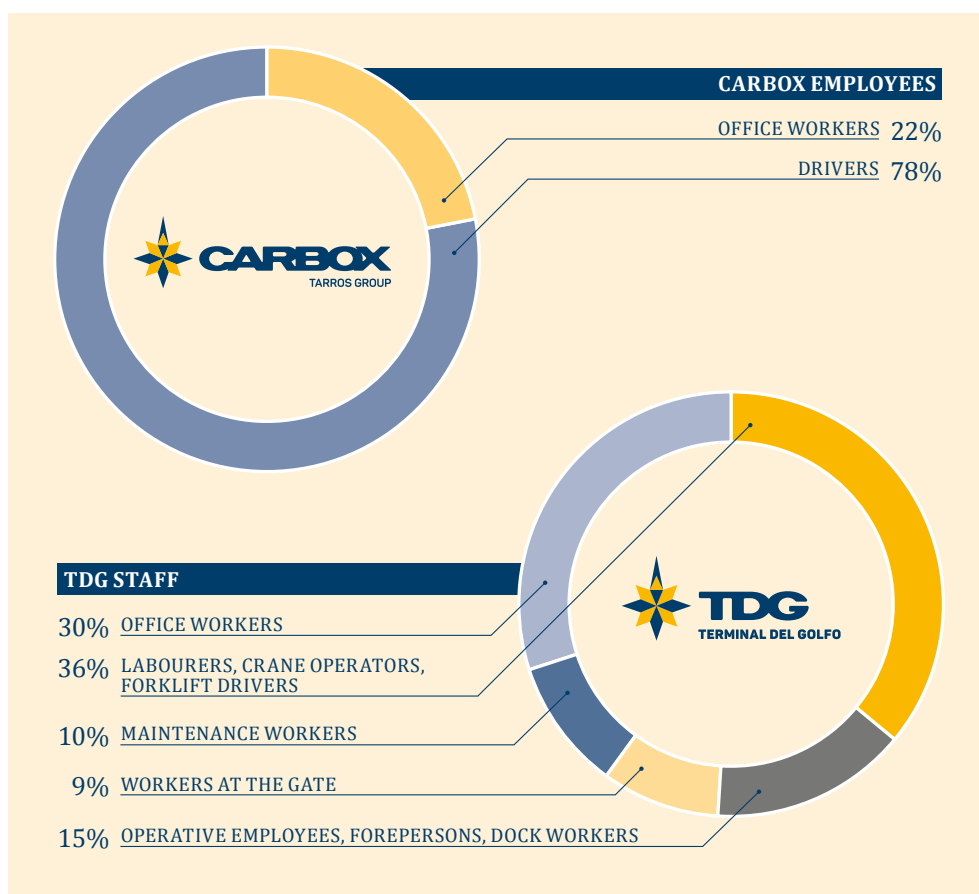
Annex 1 shows the detailed GRI KPI datasheet.

GROUP ORGANIZATIONAL STRUCTURE

Below is the organizational structure of our operating companies, a quite important share of which is represented by truck drivers (Carbox) and labourers, crane operators and forklift drivers (Terminal del Golfo). The graphical representation highlights the nature of these companies and their significant operativity in the supply of the integrated multimodal service which characterizes Tarros Group.

As a matter of fact Tarros Group can rely on the activities of different companies which may work for the Group but also for third parties, without any exclusion.

COMPANY	TOTAL EMPLOYEE NUMBER	NO. OF EMPLOYEES IN MANAGERIAL POSITIONS
TARROS SPA	157	19
CARBOX SRL	182	6
TERMINAL DEL GOLFO	47	6
CMS	15	4



On the following page are the Agencies of Tarros Group.



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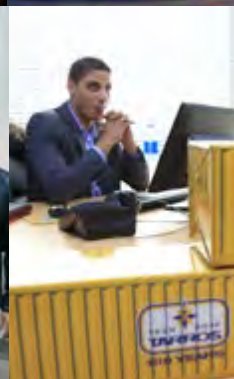
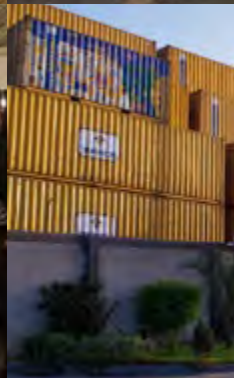
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AWARDS, CERTIFICATIONS AND MEMBERSHIPS



Tarros Group winner of the **Ship2Shore Award 2022** as a Dry Cargo Operator.

TOP JOB - BEST EMPLOYERS 2021

Tarros Group was ranked first among the transport and logistics companies and is one of the 300 Italian companies recognized as “**Top Job - Best Employers 2021**”.

The study, carried out by the German Institute for Quality and Finance (ITQF) and its Media Partner La Repubblica Affari&Finanza, is based on social listening. It analysed 438 million web sources for a total amount of 2,000 selected searches for each company and collected more than one million online mentions and citations in the last 12 months.



Three macro-areas have been taken into account:

- **Corporate Culture** (atmosphere, company welfare, remote working, flexible working , team spirit)
- **Career** (professional growth and skills development, incentives, career development, networking)
- **Corporate Values** (respect, integrity, tolerance, communication, fairness and acknowledgment)

ELITE NETWORK

Tarros Group has been admitted to ELITE Network and since 2020 has joined the Intesa Sanpaolo Elite Lounge, the private market of integrated services and multi-stakeholder network, part of the London Stock Exchange Group, aimed at supporting the selected companies in training programs, growth in size, generational handover and opening to the capital market.

Being part of this Network for Tarros Group means not only an innovative source of financing, but also, and above all, a great opportunity for our young generation who will take an active part in the training path.

OUR VALUES, OUR APPROACH TO SUSTAINABILITY: GROUP MISSION AND VISION

For Tarros Group the word Sustainability represents a corporate value. We do not consider Sustainability as a commercial requirement, we think of it as a different way of taking care: taking care of our customers, taking care of our colleagues and taking care of our community.

The Group vision results in the concept according to which efficient companies are not those just providing solutions, but those being able to provide for commercial needs and at the same time to contribute to the construction of identities, the building of social relationships and interactions with the territory.

Our striving for innovation in any sector, our taking care of people and our passion come from a daily commitment which over time has become a long tradition. All this is possible thanks to the work of over 650 colleagues who every day connect the shores of the Mediterranean sea, 16 countries, 31 ports and over 450 million people.

Tarros Group provides a highly efficient door-to-door multimodal transport solution aimed at minimizing its impact on the surrounding environment, ensuring as well high quality services and business resilience, so important in the current geopolitical scenario. Sustainability for us is synonym of efficiency, the same efficiency that has characterized our almost 2 centuries of work.

ECONOMIC PERFORMANCE

2022 has been characterized by a constantly increasing bunker and time charter cost trend, luckily balanced by a substantial revenue growth.

The upward trend in costs and revenues in our sector reflects the global trend, sustained by a great demand for transport both in the main routes (from the Far East to North America and Europe) and in the Mediterranean sea. Unfortunately in the last few months of the year the FIOS upward trend reversed.

In early 2022 we needed to replace the ship used on the Libya line (mv Holanda/Vento di Grecale) with Vento di Ponente, chartered for two years, whereas since September 2022 we have chartered a second small vessel for one year (Vento di Mezzogiorno), very similar to Vento di Ponente, with the aim of providing a service using two vessels in order to connect Morocco with Italy, Libya, Egypt and Southern Turkey (Mersin).

Below is the main indicator:

VESSEL UTILIZATION RATE	2021: 88,7%	2022: 92,7%
--------------------------------	--------------------	--------------------

As regards road transport, the year 2022 has been characterized by a great demand in transports and consequently prices have been adjusted so as to be more profitable, taking into account that costs of fuel and spare parts or tyres have risen

dramatically. The agreement with the drivers has been renewed with higher costs for the company. By increasing prices we have been able to protect our activities from the impact of increasing costs.

Eventually, as regards port activities, below are the key events occurred in 2022:

- investing in new equipment: a new state-of-the-art mobile quay crane was ordered to be used starting from the second half of 2023. This new crane will allow to improve loading and unloading efficiency thanks to its lifting capacity of up to 150 tons;
- improving operational efficiency, in particular productivity on the docks and the outsourcing plan in order to minimize inefficiency. The constant monitoring of the operational parameters has resulted in a reduction of the costs relative to the operating cycle.
- constant attention to human resources and consequent investment in training and employing new resources (under the age of 30) in the operating departments.



SUSTAINABLE INVESTMENTS

SUSTAINABILITY AS A GUIDELINE TO THE GROUP INVESTMENTS

The Group attention to sustainability issues also results in the decision to carry out sustainability assessments when making any purchase for the Group, as a matter of fact any investment made by the Group is subject to a rigorous environmental and social impact assessment.

Hereinafter we are going to describe the major investments made by the Group in the years 2022 and 2023.



TERMINAL DEL GOLFO

PURCHASE OF GREEN TECHNOLOGY CRANES

In 2022 Tarros Group purchased a state-of-the-art crane in order to meet the requirements of maritime gigantism.

Terminal del Golfo (TDG), an intermodal terminal operating in the port of La Spezia, embraces the principles of quality, choice of innovative solutions and sustainability, pursuing eco-efficiency strategies.

In compliance with the criteria of the environmental policy (UNI EN ISO 14001), the Group is committed to continuously implementing and improving its performances according to the integrated management system regarding quality, safety and environment, so as to reduce environmental impacts and pollution, as well as to monitor health and safety. In this view the Group accurately monitors energy consumption and continuously looks for methods to reduce environmental impacts. The Group is also committed to renewing facilities in support of the intermodal handling of goods in order to reduce environmental and acoustic impact. The choice of innovative equipment and means of transport designed to facilitate a more responsible use of resources allows to reduce environmental impacts and conserve primary energy resources.

In this scenario lies the project of TDG to scrap the most obsolete and under-performing means of transport having a large environmental impact and replace them with means meeting the technology current standards as regards environment, energy, maintenance, health and safety.

Currently TDG owns an electric ship-to-shore crane (STS) and two diesel powered mobile cranes (Fantuzzi Reggiane - MHC 200). Replacing the current mobile crane (Fantuzzi Reggiane - MHC 200) with the new Konecranes Gottwald mobile crane to be delivered to the Terminal in 2023 spring, would enable TDG to achieve decarbonization during loading and unloading activities from ship to terminal and vice versa, with the aim of exclusively using electrically driven machines. Terminal del Golfo is moving to eco-efficiency to reduce emissions, and this new electrically powered crane is very efficient and at the same time environmentally friendly.

With the purchase of the new crane, Terminal del Golfo is moving towards sustainable cargo handling in compliance with the strictest environmental regulations,

by reducing CO2 emissions from the terminal. Thanks to the electric drive technology of the new crane, the overall project of Terminal del Golfo will also include the extension of the electrical connection to the docks, which is functional to the installation of electrical power sources suitable to operate the Konecranes Gottwald mobile crane.



An exhaustive study relative to the functions of this new crane has enabled the technical department of Terminal del Golfo to carry out an analysis so as to forecast the volume of containers handled with the new crane. In particular, in 2021 a mobile crane was used for 2,699 hours to handle 40,009 TEUs; replacing the mobile crane with a new generation crane, according to the forecasts, will allow to use the new crane for 3,151 hours in order to handle approximately 51,051 TEUs (approximately 11,042 TEUs more compared to the present numbers).

SMART GATE SYSTEM

Tarros Group has invested in digital transformation and modernization in its Terminal, considering digital transformation as an essential investment in developing and improving sustainability. In particular the Group has invested in the automation of gate-in and gate-out procedures, in the digital transformation of railways procedures and systems and eventually, in the widespread adoption of digital technologies to help remove barriers to stakeholder engagement and in IT modernization as regards in particular empty container logistics and automation of loading and unloading processes, both on land and at sea. In the long term, these processes will significantly contribute to maximize the sustainability of our transport, Tarros Group's top priority.

The investment aims at maximizing the efficiency of existing facilities by digitizing them and introducing new IT systems specifically created for the specific nature of our procedures, essential for the overall sustainable development of the terminal operations. Therefore a lot of activities will be performed using the systems currently in use which will be integrated with external services distributed among various stakeholders in the supply chain. After all, the Group deemed it essential to introduce innovative systems, specifically created for our terminal. In particular the systems which will be integrated are the following:

- Electronic Data Interchange Software in order to edit, modify and update files;
- Notification system during transport among the various stakeholders in the supply chain;
- Terminal control system with a constant updating of the actual terminal handling capacity in order to maximize effectiveness of the decision-making process.

As for the introduction and modelling of new IT structures, they will be necessarily introduced within a clear and defined time frame, which is essential to avoid any lack of performance necessary to benefit from a system tailored to our specific needs. For this reason we will start with a trial phase followed by implementation.

The innovative introduction of the gate automation system will be mostly based on those digital innovations in which the Group has decided to invest. In particular we are going to implement the digital transformation of:

- delivery orders, customs clearance and dangerous goods declarations
- fully electronic and/or automated description of incoming container cargo
- gate system fully compliant with EDI standards for ground handling
- automated railway systems with paperless transactions
- issue of documents, delivery and booking completely digitized through EDI technology
- booking system for more transparency between the parties involved
- link to the Port Community System of La Spezia

The above investment will result in an innovative gate operating system for Terminal del Golfo as well as a fast and secure exchange of information among the stakeholders in the supply chain as well as information sharing in compliance with the requirements of the Port Community System. Besides, the Group will also invest in training programs for employees to develop their digital skills.

We also expect a significant drop in CO2 emissions from the vehicles used within the Terminal and the trucks carrying containers. Moreover, we are going to maximize terminal operators safety by reducing container handling operations and maximizing their operational efficiency. Reducing the number of operations by reducing unnecessary container handling through digital transformation will allow our terminal to achieve a sustainable development.

LIGHTING AT TERMINAL DEL GOLFO

In 2022 the Group decided to make investments to replace the lighting system in our Terminal with a dimmable LED lighting system with the highest environmental performance and minimum energy consumption.



CARBOX

POMARA HUB

Tarros Group has invested about 1.5 million in order to redevelop the Pomara area with the purpose of improving work efficiency of Carbox activities by creating a hub for a truck parking area, container storage, workshop and equipment suitable for performing these activities.

In particular, the parking area has been redeveloped installing an efficient security system and a sustainable lighting system by utilizing the most efficient and environmentally friendly available systems.

At the same time, particular attention has been paid to the impact of these activities on the local territory, therefore we have decided to plant some cypresses around the redevelopment area.



CARBOX FLEET RENEWAL

With the purpose of promoting sustainable multimodal services and maximizing logistics efficiency, Tarros Group has invested in the growth of Carbox.

From 2018 to 2022 Carbox expanded, indeed increased its fleet from 105 to 160 Euro 6 trucks. A study has been conducted to assess the potential efficiency of methane-powered trucks according to which the current infrastructures cannot support the quality of services provided by the company. For this reason the company fleet has been renewed with Euro 6 trucks, this being considered to be the best choice in order to ensure sustainability and service quality.

Investments over the years have enabled Carbox to be more present both on the national and international scene, which has resulted in a significant increase in the company turnover. From 2018 to 2022 the turnover increased constantly, and in 2022 it was equal to 30 million, with an increase by 67%. Besides, Carbox Maroc was set up in 2022 and Carbox Egypt in 2023, respectively the first Moroccan and Egyptian Carbox head offices.



CARBOX DIGITAL TRANSFORMATION

The Group has made investments in the digital transformation of some corporate procedures through a web system and Mobile App development allowing information exchange between administration offices and field personnel (drivers).

In particular, the activities performed by the drivers throughout the day are automatically recorded using the app, which allows to eliminate printed material, a key goal for the Group, and data are collected in a tabular form.

Moreover, the Truck & Trace application has been installed to allow drivers to send information about their position on their route. We have also focused on documental management, with the aim of reducing paper waste, for example downloading a digital waybill through app.

Whenever it was not possible to completely eliminate paper, every vehicle has been equipped with a printer to allow drivers to directly print transport documents, thereby maximizing service efficiency and simplifying procedures for employees.





TARROS HOME: MORE THAN JUST A WORKPLACE

Tarros headquarters was set up in Spezia in 1972, and the owners, inspired by their own activities, decided to use containers to build it. In response to business expansion over time and the increasing number of employees, a restyling of spaces had become necessary, therefore in 2022 we started to build the new headquarters.

We have chosen to continue on the path which was taken 50 years ago, in harmony with the existing structures, but keeping in mind the idea of progress and innovation which has always been shared within the company. Our main goal is to create a versatile and cosy space that feels like home, where sustainability and flexibility are key factors. Our offices will convey the Group's comprehensive sustainability vision.

The building will be easily accessible by people with disabilities and will be certified by the non-profit organization "Lo Spirito di Stella". Furthermore, photovoltaic panels will be installed on the roof in order to minimize the environmental impact of our activities.

The new building will be a flexible workplace where employees will be free to choose how to work according to their needs and preferences, making their office feel like home.

There will be large coworking spaces to be used as recreational areas as well, essential even during working hours. Another important concept we are going to develop with the new offices is digital transformation which will improve connectivity and will allow employees greater freedom and flexibility at work.

To date, the building is expected to be completed by summer 2024.

DIGITALIZATION: TARROS WEB EVOLUTION

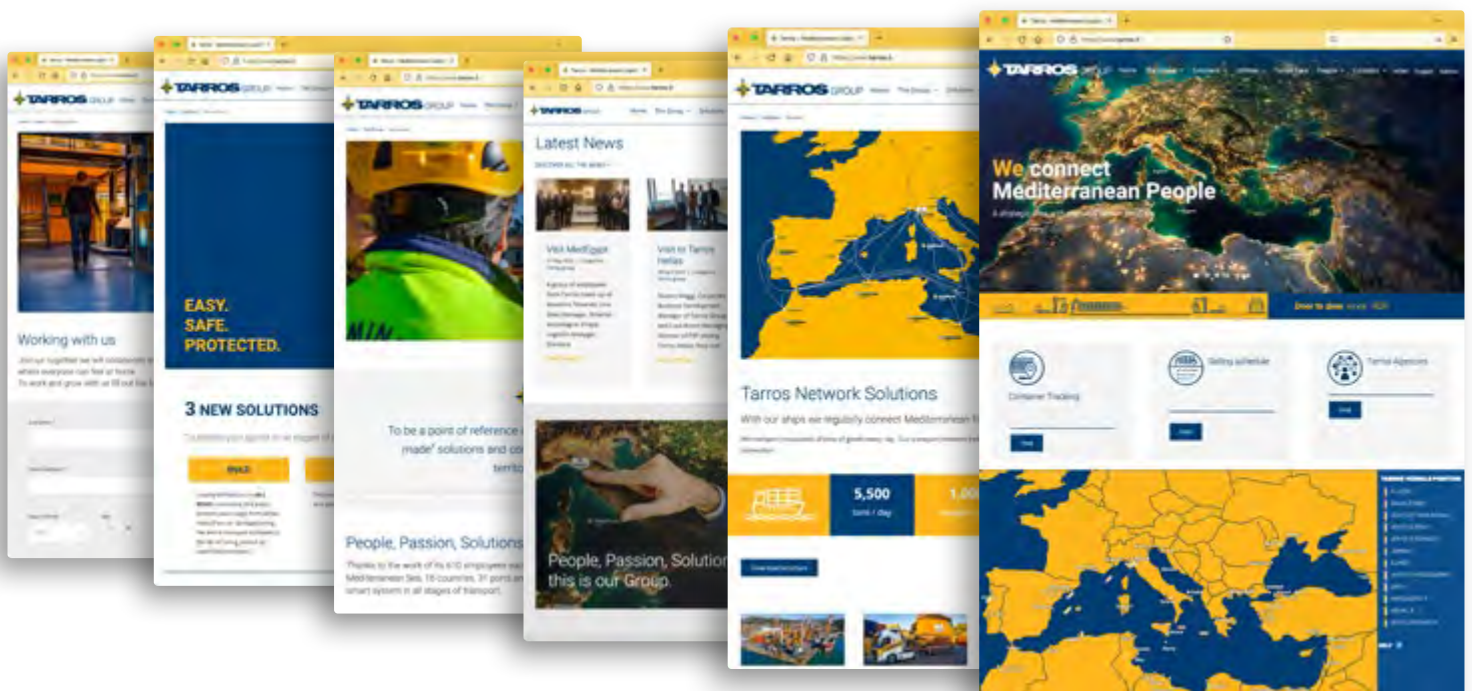
In the late spring of 2022 the Group launched its new website, a digital environment completely renewed, which tells about the Group history through its companies, but is also an extremely useful tool for our customers.

Customers can track the container carrying their goods as well as the Group vessels and can check the relative sailing schedule. Along with the website renewal, the Group has developed Tarros World, a digital system with two main tools: the company intranet and the information displays.

The Intranet is divided into 4 areas, taking into account any person belonging to the Group and their needs:

- **Tarros News:** constant updating on the various activities, attendances at fairs and conventions.
- **Tarros for You:** corporate welfare
- **Tarros People:** digital access to personal documents
- **Tarros Tools:** digital tools that employees can download

The second tool, the information displays, have been installed in the various operating departments with the aim of sharing technical data and information regarding the Group and the world. The Group has embraced digitization in all relevant areas in order to facilitate well-being among colleagues and maximize job sharing and eventually the awareness of each other's work: the value of sharing is fundamental to create the unity which characterizes our Group.



ENVIRONMENT

TARROS GROUP FOR THE ENVIRONMENT

WASTE MANAGEMENT

Waste management within the Group is regulated by Legislative Decree 152/2006 and complies with ISO 14001 certification.

The environmental policy of the Group particularly focuses on waste recycling, adopting the principles of circular economy, which has resulted in an increase in the amount of waste to be recycled compared to the amount of waste directed to disposal.

As a matter of fact in 2022 over 91% of the waste generated by Terminal del Golfo, the company in the Group that generates the largest quantity of waste, was recycled, even if the amount generated did not change.

As regards Tarros S.p.A., 100% of the waste generated is classified as non-hazardous waste and can be totally recycled, consistently with our vision for a circular economy. Nearly all the waste generated by Carbox can be recycled.

The Group is committed to minimizing the environmental impact of its activities, as well as to preventing any release of hazardous substances generated by its land-based and sea-based activities into the environment.

TERMINAL DEL GOLFO

WASTE	2021	2022
Hazardous	15.711	11.551
Non-hazardous (kg)	82.728	88.182
Total (kg)	98.439	99.733
% of total waste directed to disposal	32,06%	8,65%
% of total waste to be recycled	54,65%	91,35%

TARROS

RIFIUTI	2021	2022
Hazardous	0	0
Non-hazardous (kg)	114.540	75.088
Total (kg)	114.540	75.088
% of total waste directed to disposal	0%	0%
% of total waste to be recycled	100%	100%

CARBOX

RIFIUTI	2021	2022
Hazardous	3.909	4.141
Non-hazardous (kg)	11.324	9.498
Total (kg)	15.233	13.639
% of total waste directed to disposal	0,9%	1%
% of total waste to be recycled	99,1%	99%

ENERGY MANAGEMENT

Energy consumption, associated with energy rationalization, represents an essential parameter to describe its impact not only in terms of efficiency, but also on the environment. The system monitoring energy consumption enables the company to identify those areas where it is more necessary to intervene in order to better rationalise resources in view of a better energy efficiency strategy.

The company performed an energy diagnosis in 2019 and is going to perform a next one in spring 2023 so as to ensure a constant control, but also an energy efficiency improvement.

In addition to the energy used in the workplace, the company consumes a large amount of fuel for ships and trucks.

The table below shows the amount of fuel used by ships in the years 2021 and 2022:

	2022	2021
MGO (tons)	3.636,5	1.965
IFO 380 (tons)	21.200,16	20.130

CARBOX TRUCK CONSUMPTION IN 2022

DIESEL	4.082,19
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ENERGY CONSUMPTION IN 2022	KWH
TERMINAL DEL GOLFO	858.081
TARROS HQ + REEFERS IN RELEVANT CUSTOMS AREA	517.694
HEADQUARTERS IN GENOA: TARROS AND CARBOX OFFICES	7.569

OFFICES IN VENICE	5.427
CARBOX WORKSHOP	29.054
POMARA HUB	669

SHORT SEA SHIPPING VALORISATION: COMPARATIVE STUDY OF EMISSIONS FROM TARROS ROUTES

Following the creation of our sustainability department, we have decided to create a map of the Group shipping lines in 2022.

While analysing the traffic in 2022, it is possible to identify three types of activity: out of a total of 77,117 containers shipped in 2022, 41.3% was used in export, 33.6% in import and the remaining 25.1% in cross trade shipments.

It is interesting to note that 75.9% of the whole traffic in 2022 had Italy as port of origin and/or destination (import and export), which implies that each of these containers passed through ports and roads in the Italian territory. This data becomes particularly relevant if we consider the criteria for the allocation of funds published in the Marebonus Scheme.

From the above data we can infer that the Group handled 57,795 containers from/to Italy in 2022 only, of which 41.9% maritime traffic with Turkey, a long-standing reference country for Tarros Group, 37.7% traffic with North Africa, the Middle East and the Black Sea; and the remaining 10.4% traffic with EU countries, namely Malta, Greece and Portugal.

This being said, we still need to underline that the above mentioned lines are defined as Short Sea Shipping, and that as regards CO2 emissions the most sustainable way of transport appears to be the intermodal transport by container ships, as data will show. Nevertheless, multimodal transport by container ships must compete against other modes of transport which are granted state and/or foreign aid, despite not being the most efficient mode of transport.

SIMULATION BETWEEN MULTIMODAL TRANSPORT AND FULL TRUCK LOAD TRANSPORT ON GREECE, PORTUGAL AND TURKEY LINES

Tarros Group has carried out a simulation study aimed at comparing the environmental sustainability of multimodal transport by container ships with the sustainability of full truck load transport and Ro-Ro shipping using trailers.

The study simulated that all Tarros transport services in 2022 were carried out using full truck load transport instead of multimodal transport by container ships.

In particular Turkey, a state candidate for EU membership, has a free market economy where shipping operators cannot count on any state and/or foreign aid when deciding what mode of transport to use, according to the arm's length principle. In this scenario, intermodal transport by container ships has the same impact as Ro-Ro transport. Besides, Ro-Ro ships mostly operate in Trieste, and recently, but almost insignificantly, in Bari, whereas the container ships belonging to Tarros Group arrive at and depart from 7 Italian ports and depart from and arrive at 7 Turkish ports, significantly reducing road transport.

In 2022 only, Tarros Group shipped 30,023 containers from and to Turkey. By

simulating this transport using Euro 6 trucks it has been proven that its impact on European roads would be significant. In this specific case, thanks to the intermodal transport by container ships, Tarros Group has avoided covering a total distance of more than 19 million kilometers in the Italian territory, about 26.3 million kilometers in the territory of some EU countries and almost 15.5 million kilometers in the Turkish territory. This resulted not only in a significant reduction in road traffic, but also in a significant reduction in CO2 emissions in those countries. If transport in 2022 had been carried out by Tarros Group using trucks, the tons of carbon dioxide would have been much more significant.

As regards traffic with Greece and Portugal, the situation is different. Unlike the Turkish market, Greek and Portuguese markets are characterized by a strong competition against full truck load transport and multimodal transport by Ro-Ro ships, a mode of transport currently encouraged by the Marebonus Scheme. It is therefore clear that Tarros traffic with Greece and Portugal is much lower than the traffic with Turkey. Carrying out the same kind of simulation as we did for Turkey, Tarros Group simulated full truck load transports in those two countries. It is evident that the annual transports carried out by Tarros Group would cover 9 million kilometres in the European territory and over 2 million kilometres in the Italian territory, for a total amount of 5,525 containers and as many trucks in EU countries and Italy.

Following this analysis, Tarros Group has commissioned the engineering company Tecnoceo, to draw up a comparative study on two strategic lines. The study analyses the emissions from the different types of transport on the same lines underlying the much lower environmental impact of short sea shipping and related multimodal transport by container ships.

The detailed comparative study is attached as Annex 2.

PLASTIC-FREE PROJECT

Our company has embraced a plastic-free project placing water dispensers in each head office and giving each employee a flask in order to reduce plastic waste.

For the same reason, during meetings, events or conferences, we do not supply either plastic bottles or glasses, but reusable glasses and jugs, thus reducing waste.

**TARROS GROUP
PLASTIC FREE
PROJECT**

- PLASTIC FREE
- 100% BPA FREE
- SENZA PERDITE
- IGIENICHE

www.tarros.it

TARROS GROUP
INNOVATIVE LOGISTICS SOLUTIONS

Plastic Free Project

**PERCHÉ
DIVENTIAMO
Plastic Free?**

1 milione al minuto, 20 mila al secondo. Questi sono i numeri delle bottigliette acquistate nel mondo. Un numero in continua crescita, che prevede solo una piccola percentuale di riciclo a sempre una maggiore quantità nei nostri magazzini, tra i 5 e i 13 milioni, circa 700 chili al secondo!

Il Gruppo Tarros, grazie a principi come qualità, soluzioni innovative e sostenibilità porta avanti una filosofia di gestione orientata all'eco-efficiency.

I nostri OBIETTIVI

- Eliminazione delle bottigliette di plastica in azienda.
- Installazione di erogatori di acqua minerale naturale e frizzante.
- Distribuzione di borracce in alluminio ai dipendenti.
- Sostituzione nei distributori dei bicchierini e palettine di plastica con quelli di carta.
- Proposte ai dipendenti di percorsi virtuosi per diventare sempre più plastic free.

Plastic Free
www.tarros.it

TARROS GROUP **INNOVATIVE LOGISTICS SOLUTIONS**

SOCIAL

TARROS FOR SOCIAL AND THE COMMUNITY

TARROS FOR YOUTH

In 2022 Tarros Group hired 54 new employees.

As regards its Foreign Agencies, from 2021 to 2022 26 new employees were hired, 30% of which are women.

The Italian companies from 2021 to 2022 hired 28 employees with a permanent employment contract or a fixed-term contract becoming permanent after 2 years, 46% of which are women and 71% were under 30 when they were hired. In the same period 6 employees retired and 6 were laid off.

Key priority for the Group is tackling the Gender Pay Gap in all the companies of the Group to ensure that men and women receive equal pay for work of equal value.

	TARROS GROUP	HOLDINGS
PERCENTAGE OF EMPLOYED WOMEN	34%	52 %
PERCENTAGE OF WOMEN IN MANAGERIAL POSITIONS	26%	29%

WELFARE POLICY: WORK-LIFE BALANCE

Individual well-being, corporate well-being, and the common good are intrinsically linked. Corporate welfare, through which Tarros Group takes care of the well-being of its employees and their families, enhances the coalition between employees and those who are responsible for the company growth. By offering goods and services to its employees Tarros Group strengthens its long-standing relationships with the territory and with stakeholders.

Being deeply rooted in the territory is extremely important to Tarros in relation

to both the material and cultural resources that the company finds in the territory and the territory development that the company enhances. This is the reason why Tarros has launched the welfare program “Tarros for you: for you and your family” aimed at underlining the company role in promoting work-life balance and its commitment to protecting and improving this balance.

“Tarros For You” is based on the assumption that feeling comfortable at work means creating an enjoyable environment, and that therefore individual well-being contributes to collective wellbeing, thus increasing productivity.



REMOTE AND FLEXIBLE WORKING

Tarros Group has embraced the opportunity to adopt remote working learning from the covid-19 pandemic period. A lot of companies introduced remote working to cope with the pandemic situation, but in the post-pandemic era, employees there are back in the office.

On the contrary Tarros Group has embraced the opportunity of adopting flexible working with the aim of promoting life-work balance.

For this reason, we have decided to adopt remote working if requested by employees or in cases where work can be done remotely. Nearly all employees have accepted and signed the remote work agreement, which ensures any employee the possibility to work remotely in accordance to their private life needs. Moreover the Group has provided employees with all the material they need to do their work, such as laptops, network devices, webcams.

In order to achieve flexibility at work and life-work balance, mothers or fathers equally are given the possibility to work either full time or part time until their child turns three. This rule applies equally to both parents for both maternity and paternity protection so as to eliminate gender discrimination

SPORTS SPONSORSHIP

SPEZIA BASKET CLUB AND TARROS GROUP ARE STILL TOGETHER: 32 years of uninterrupted partnership: a uniqueness in the territory, an unbreakable bond. That is

how we can describe the long-standing bond between Spezia Basket Club and Tarros Group, a 32-year-old relationship which has been confirmed in this sport season, too. The name and logo of the then Tarros S.p.A , today Tarros Group, appeared for the first time in 1990 on the jerseys of the longest-running basketball club in La Spezia. After 32 years that logo is still there, on the black and white jerseys, witness of a bond that over the years has become more than a simple sponsorship.

The relationship between Tarros Group and the basketball team, proud to be named after its sponsor, is based on trust, respect and admiration, which allows to keep such a long-lasting relationship with mutual satisfaction and gratitude. The basis of everything is the strong determination of Tarros Group, one of the best-established and appreciated companies in the province of La Spezia and one of the best-known worldwide, to keep and constantly strengthen the bond with the territory in terms of culture, social and sport. Tarros Group has always supported sport in La Spezia and our cooperation with Spezia Basket Club represents the continuous commitment of the company in the territory.

The Group recognizes all the values which have allowed the company to grow since 1828 and finds them in sport and in particular in Spezia Basket Club. Professionalism, determination, strong will have allowed Tarros Group to become what it is today. The same gifts in sport have allowed Spezia Basket Club to become the longest-running basketball club in La Spezia and the one, among all the teams from Liguria, that plays in the highest league. Their goal is to play in Serie B basketball league, a dream that can become true also thanks to Tarros Group substantial and stable sponsorship.



WOW PROJECT: WHEELS ON WAVES

The WoW Project, created and promoted by the non-profit organization “Lo Spirito di Stella”, since 2017 has been giving the opportunity to people from different cultures or having different abilities to live the unique and unforgettable experience of sailing a boat. This project aims at demonstrating that it is possible to remove barriers and wants to call for respect of the rights set out by the United Nations Convention on the Rights of Persons with Disabilities.

“Lo Spirito di Stella” communicates values, positive actions and above all the passion in doing something together for everybody. Tarros Group has joined “Lo Spirito

di Stella” because in line with the company core values. Tarros was set up 190 years ago to transport goods needed on a daily basis. Thanks to the same passion and spirit of innovation with has characterized the company since the very beginning, in 2021 Tarros employs 610 people and connects 450 million people.

TARROS AND SAILING

Tarros Group pays special attention to Sailing, a sport which particularly cares about sustainability: fuel consumption is significantly reduced and the selection of the materials used to build boats is based on the principles of circular economy. For this reason Tarros Group considers Sailing a sport in line with the company core values.



In this regard, Gruppo Tarros is proud to have sponsored Ambrogio Beccaria, the winner of the Mini Transat 2019.





Moreover, as proud sponsors of Giovanni Soldini and Maserati Multi 70 we provide him with a technical base and logistics support.

SPONSORSHIP TO BORGATA FOSSAMAISTRA

Tarros Group sponsors the Borgata Fossamastra, a small hamlet where we have our headquarters. This sponsorship over the years has allowed the Borgata Fossamastra to take part in several activities, among which:

- the “Palio del Golfo” of La Spezia taking place on the first Sunday in August in front of the sea promenade. It is a rowing race involving 13 boats whose hulls are similar to the hulls of the “Italian gozzo”, a very fast and agile boat handmade by local craftsmen.
- Italian Rowing Championship of “Gozzo Nazionale”, a type of rowing boat ap-

proved by the Italian Rowing Federation, with fixed seats, used in Genoa for the first time in 1986.

- Sport fishing championships for Fipsas members (Italian Federation of Sport Fishing and Underwater Activities)

TARROS SARZANESE FOOTBALL TEAM

Tarros Sarzanese Club was set up in 1999, and in 2022 opened its 23rd season .

At present the football club runs the “Cittadella dello Sport” sports center in Sarzana.

The sports center has a stadium with a natural grass pitch and a running track (Miro Luperi Stadium), and other two natural grass pitches (Sussidiario and Pasquale Berghini), a 7-a-side artificial turf pitch, a 5-a-side artificial turf pitch and a restaurant and bar.

The Club counts approximately 300 members and 15 teams, the first team plays in the “Campionato di promozione ligure” (Ligurian non-professional league), the junior team plays in the “Campionato d’eccellenza ligure” (Ligurian non-professional league), and all the other teams play in junior leagues.

In 2015 they won the “Campionato regionale giovanissimi” (junior regional championship).

The club organizes the “Torneo Internazionale Tatain”, an international tournament for children under 10 which involves Italian and European football clubs, approximately 600 athletes and 2,500 spectators overall.

GOVERNANCE

Tarros S.p.A. corporate governance and in general its organizational structure aim at ensuring implementation of strategies and achievement of targets in compliance with the law. TARROS S.p.A. organizational structure has been created taking into account the need of ensuring maximum operational efficiency and effectiveness.

TARROS S.P.A. GOVERNANCE MODEL

Considering the peculiarity of its organizational structure and the activities carried out, TARROS S.p.A. has decided to adopt the monistic system (i.e. a system based on the presence of a Board of Directors and a Management Control Committee).

The corporate governance system of TARROS S.p.A. is the following:

Shareholders' Meeting:

The shareholders' Meeting deliberates on the issues in compliance with the law or the articles of association, in ordinary or extraordinary sessions.

Board of Directors:

The Board of Directors has the broadest powers for management and is responsible for implementing and achieving the corporate purpose, in compliance with the law and the articles of association. The Board of Directors is also responsible for determining the Company's strategic plans, verifying the efficiency of the Company organizational and administrative structure. The Board of Directors has delegated specific powers to some of its members (e.g. CEOs, managing directors and proxies).

Board of Statutory Auditors:

The Board of Statutory Auditors verifies the adequacy of the Company organizational structure, the internal control system as well as the administrative and accounting system and their suitability to properly represent the business model.

ORGANIZATIONAL STRUCTURE

In order to define the role and responsibilities of everyone in the Company decision-making process, TARROS S.p.A. has drawn up an Organization Chart which out-

lines its organizational structure.

POWERS OF ATTORNEY AND PROXIES

In compliance with best practices and the guidelines issued by Confindustria, the Board of Directors of TARROS S.p.A. has authority to delegate powers which are conferred in coherence with the organizational and managerial responsibilities, accurately indicating the spending limit.

The level of autonomy, the power of representation and the spending limit assigned to the various holders of proxies or powers of attorney within the Company are always identified and established coherently with the hierarchical level of the holders and are limited to what is strictly necessary to carry out the tasks and duties conferred upon them.

The powers conferred are periodically updated according to any possible change in the organizational structure.

Powers of Attorney and Proxies in Tarros S.p.A.:

The Board of Directors has delegated and delegates the powers which are strictly correlated and functional to the competences and functions of the delegated person, limited to the approved spending limit, and separately identified for each activity.

Proxies and powers of attorney are drawn up and documented in compliance with specific guidelines.

The aforesaid system for delegation of powers is constantly applied and regularly monitored according to any possible change in the organizational structure, so as to be as consistent as possible with the functional-hierarchical organizational structure of the Company and its needs. Single updates are carried out soon after any variation in the function, role or task of the single subject, as well as periodical updates concerning the whole system.

MANUAL AND I.T. PROCEDURES

Within its organizational structure, TARROS S.p.A. has created a system of procedures, both manual and computerized, aimed at regulating the implementation of the corporate activities in compliance with the principles provided for by Confindustria Guidelines.

In particular, the procedures implemented by the Company constitute the rules to comply with during business processes and they also provide for the controls to be performed in order to ensure fairness, efficiency and effectiveness in all corporate activities.

As regards information technology procedures in particular, the main administrative management systems are supported by high quality application software. This software represents the “guidelines” for the implementation of specific transactions

and ensures a high level of standardization and compliance, since the processes managed by this application software are verified before the release of the software itself.

The administrative area (customers, suppliers, general accounting, assets, credit management) is managed through a proper IT platform which enables the Company to ensure compliance with the following principles:

- encouraging the engagement of more subjects in order to obtain an adequate segregation of duties through separation of functions;
- taking the necessary steps to ensure that every operation, transaction or action is verifiable, documented, coherent and congruous;
- requiring the adoption of measures aimed at verifying that controls regarding the operations and/or activities undertaken have been carried out.

Procedures are disseminated and publicized in the departments concerned through specific information and training.

Cybersecurity:

Cyber risk is one of the most serious business risks for any organization, therefore in order to quickly adapt our behaviour to this new reality, we need to train our employees to become the first line of defence, the so-called Human Firewall.

The methodology implemented by the Group is based on an overall vision of the whole organizational structure according to which structured training programs for the entire organization or a considerable part of it are required. Said training programs are composed of learning modules in sequence and relative instructional topics taking into account the preparatory guidelines in order to improve effectiveness of training and build a security culture shared by the entire organization on Cyber Security Awareness.

For this reason the Group has decided to invest in an innovative e-learning platform to improve cybersecurity so as to tackle cyber threats.

This platform aims at providing training courses for all those workers in any organizational structure, even the largest and most complex ones, who have access to digital technologies and the Internet and may therefore become an unaware vector of a cyber-attack and thus become a vulnerability in Cyber Security. CGA platform provides a 3-year training program using monthly training modules with yearly consolidation activities. The training modules include video lessons and relative assessments. Given the importance of training in this particular field, we want to underline that the platform has been created to improve employee engagement in the Group through an advanced training method which is essential to ensure the effectiveness of Cyber Security Awareness training, in particular for large organizations.

The purpose of Cyber Security Awareness Training goes beyond the transfer of security-related knowledge to the other colleagues, it is crucial for the users to get used to a safe and responsible use of digital technologies, as is the case in other aspects of our life and our job.

WHISTLEBLOWING

The whistleblowing system in the company allows to report any non-compliant conduct to an external supervisory body. So far no non-compliant conduct has been reported within the Group.

OUR CERTIFICATIONS

TARROS Group operates in compliance with procedures which ensure high-quality services, protection of health and safety of its workers and a fair and responsible environmental management with the purpose of ensuring work efficiency and compliance with the sector-specific regulations.

The Company has obtained the voluntary UNI EN ISO 14001 certification, and the safety management system certification pursuant to UNI EN ISO 45001 standards.

In May 2015, TARROS S.p.A., following to assessments and audits carried out by the Customs Agency, received the IT AEOF 150989 certification as an Authorised Economic Operator, Customs Simplifications and Security.

In compliance with Model 231 all suppliers, external collaborators, consultants and trading partners are required by TARROS Group to comply with the law and regulations, the ethical and social principles and the provisions of the Model, as well as to examine the Code of Ethics and the Model. On this purpose a specific contract clause provides for compliance of third parties with the aforesaid, and in case of violation provides for measures to be taken by TARROS. Following the entry into force of Law no. 123/2007 and the Legislative Decree no. 231/2001, a work team composed of some company staff and external consultants has been built to draw up the existing Model and carry out all the activities required by the Model itself, after having analyzed the Company organizational structure and activities, in particular as regards its relations with the public administration, ICT-related activities, administrative and corporate activities, supply management, examination of documents, health and safety in the workplace and the environment.



CODE OF ETHICS

TARROS performs its activities and business in compliance with the laws and regulations of the countries where it operates, as well as with the corporate rules according to the principles of lawfulness, fairness, transparency and respect for human dignity.

Moreover, TARROS aims at improving competitiveness on the market in full compliance with the principles of fair competition and at promoting the correct and responsible use of resources focusing on social responsibility and environmental protection.

The goals of increasing production and market share, as well as strengthening the ability to create value are pursued ensuring suitable decision-making and operational standards to the Company organizational structures and processes with the purpose of developing new businesses, improving business efficiency, as well as risk management and measurement systems.

This Code of Ethics has been drawn up to ensure that Tarros S.p.A. ethical values are clearly defined and constitute the basis for business culture and behavioural standards for all the collaborators when performing the company business activities.

The Company has felt the need to clearly formalize all the principles to which it attributes a positive, primary and absolute ethical value. These principles represent the fundamental values with which all the subjects shall comply according to the Code of Ethics while carrying out the Company mission and in general the Company activities.

In particular the fundamental ethical principles followed by Tarros S.p.A. refer to the following values and areas of activity:

- **responsibility and compliance with the current laws, codes and regulations;**
- **fairness:** recipients shall behave fairly to avoid conflicts of interest, that is all the situations where the pursuit of any individual interest is in contrast with the Company's interests and mission. Moreover, all those situations shall be avoided where employees, administrators or other recipients can take undue advantage and/or profit from opportunities arisen while carrying out their activities;
- **impartiality:** Tarros S.p.A. rejects and repudiates any discrimination principle based on sex, nationality, religion, personal and political opinions, age, health, economic conditions of their interlocutors, including their suppliers. Any subject who thinks they have been discriminated shall report to the supervisory body that shall verify the actual violation of the Code of Ethics;
- **honesty and transparency:** these values represent the fundamental principles on



- which all Tarros S.p.A. activities, undertakings, products and/or services, statements and communications are based and are an essential part in the Company management;
- **integrity:** Tarros S.p.A. neither approves nor justifies any violent action or threat aimed at a behaviour contrary to the regulations in force, including the ethical rules and/or the Code of Ethics;
 - **efficiency:** every activity shall be performed taking into account the management and utilization of the corporate resources according to the most advanced quality standards;
 - **fair competition:** Tarros S.p.A. recognizes the value of competition when based on the principles of fairness, correctness and transparency towards operators on the market, and is committed not to damaging competitors and their brand image unjustly;
 - **privacy protection:** Tarros S.p.A. is committed to protecting the privacy of recipients according to the regulations in force, aiming at avoiding the transmission and dissemination of personal data without the data subject's consent. The acquisition, processing and retention of the disclosed information and personal data regarding the personnel and third-party recipients are in compliance with specific procedures aimed at ensuring that the personal data or information shall not be disclosed to any unauthorized party and/or body. These procedures are in compliance with the current regulations;
 - **spirit of service:** recipients, within their competence and responsibilities, shall behave in the pursuit of the corporate mission in order to assure a service of high social value, essential to the community that shall benefit of the highest quality standards;
 - **the value of human resources:** human resources are a fundamental and inalienable value for the Company's development. Tarros S.p.A. protects professional growth and development in order to improve personal skills in compliance with the current regulations on personality rights, in particular as regards its personnel's moral and physical integrity. Tarros S.p.A. is committed not to encouraging any form of favouritism and nepotism as well as not to starting any working relationship with third parties involved in terrorism. The personnel is exclusively hired with regular employment contracts since no form of irregular work is tolerated. Applicants shall be informed on the characteristics of working relationships. Salary increases, incentives or promotions to a higher positions are granted not only in compliance with the law and the national collective agreement, but are also based on individual merits, as for example the ability to develop behaviours and organizational skills in compliance with the Company's ethical principles as indicated in this Code;
 - **relationships with the community and environmental protection:** Tarros S.p.A. is committed to operating respecting the environment and the health of individuals, well aware of its social and ethical responsibilities towards the community where the company operates and finds its resources;
 - **relationships with local and public authorities:** Tarros S.p.A. pursues the goal of maximum integrity and fairness in its relationships, including the contractual ones, with public authorities and in general with the public administration, aiming at ensuring the maximum transparency in the institutional relationships in line with the needs of organizational and managerial autonomy of business operators. The relationships

with institutional authorities shall be managed exclusively by subjects authorized to do so. In case a consultant or third party represents Tarros S.p.A. in its relationships with the Public Administration, said consultant or third party shall comply with the personnel regulations; besides, the company in its relationships with the public administration shall not be represented by a third party in case of any possible conflict of interest;

- **relationships with international operators:** Tarros S.p.A. ensures that all the relationships, including the commercial ones, with subjects operating at international level fully comply with the law and the regulations in force, with the aim of avoiding the risk of committing transnational crimes. For this purpose the company shall take all the necessary steps to verify the reliability of these operators and the lawful origin of the capitals and means used in their relationships with the Company. Besides Tarros S.p.A., within the limits of its competence, is committed to cooperate with fairness and transparency with authorities, foreign ones as well, which may request information or carry out investigations as regards the existing relationships between the company and international operators;
- **rejection of any form of terrorism:** Tarros S.p.A. rejects any form of terrorism and takes all the necessary steps to prevent the risk of being drawn into terrorism, thus contributing to the achievement of peace among peoples and democracy. To this end the company is committed not to start any working or commercial relationship with a third party, either a natural person or a legal person, involved in acts of terrorism as well as not to finance or in any case facilitate their activities;
- **protection of individual personality:** Tarros S.p.A. recognizes the need of protecting individual freedom in all its forms and rejects any manifestation of violence, above all if aimed at limiting personal freedom, as well as any form of juvenile prostitution and/or pornography. The company promotes the sharing of these principles in its activities and among recipients;
- **protection of health and safety in the workplace and environmental protection:** Tarros S.p.A. makes any effort to pursue the aim of ensuring a healthy and safe workplace and respecting the environment. In this regard the company takes the most suitable measures to avoid any risk linked to its activities and, where not possible, to carry out a suitable risk assessment in order to tackle risks directly at the source and eliminate them. In its activities Tarros S.p.A. is committed to adapting work to the individual especially as regards the design of workplaces and the choice of equipment and working and production methods, in particular to minimize monotonous and repetitive work and reduce the impact of such works on health;
- **child labour:** the respect of human rights and protection of human dignity in the workplace are fundamental values for Tarros S.p.A.. For this reason the company repudiates any form of labour exploitation, in particular of children labour, considering it as an unacceptable form of work and therefore absolutely prohibited. Given the above, Tarros S.p.A. does not employ workers under the legal minimum age for employment in compliance with the current laws and regulations. The aforesaid principles and prohibitions are essential to Tarros S.p.A. and all the company's suppliers, both in Italy and abroad, are requested to comply with them.;

- **protection of workers in the performance of professional activities:** Tarros S.p.A. does not tolerate any form of mobbing, violence or physical, psychological and/or sexual harassment in any relationship both inside and outside the company. For this reason Tarros S.p.A. condemns any behaviour aimed at creating an intimidating and hostile environment that isolates or discriminates a person or a group of workers, as well as unjustified interferences which may affect the personal and professional growth of each employee. Therefore Tarros S.p.A. ensures a working environment that respects and protects the dignity of the person and promotes the development and growth of each employee considering their skills and professional aspirations, in line with the company's organizational structure.

SUSTAINABLE DEVELOPMENT GOALS

Tarros Group is committed to improving its sustainability performance by pursuing concrete goals. For this reason, in agreement with the Board of Directors, we have set some goals relative to the three main issues covered in this report - Environment, Social and Governance - and have agreed to achieve them in 2023. Specifically:

Environment:

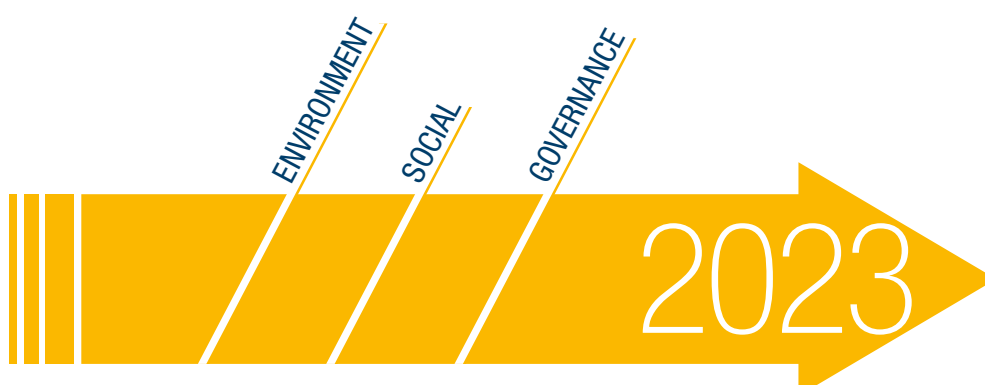
- Achieving decarbonization in the short, medium and long term
- Digital transformation to calculate CO2 emissions and compensation for each customer
- Emissions reporting in accordance with scope 1, 2, 3 GHG emissions,
- Replacing 10% of trucks with eco-friendly petrol powered trucks

Social:

- Collaboration with schools and training institutions
- Hiring process partial digitalization
- Considering a gender equality certification
- Sponsoring other sports
- Sponsoring activities with shared social values

Governance:

- Reviewing the Risk Assessment Document (DVR) and the Code of Ethics
- Joining the UN Global Compact
- Improving stakeholders engagement



ANNEXES

- **Annex 1:** GRI KPI datasheet
- **Annex 2:** Comparative Study on emissions drawn up by Tecnocreto

GRI KPI DATASHEET

INDICATOR SECT.	INDICATOR NO.	INDICATOR DESCRIPTION
ORGANIZATIONAL PROFILE (2016)		
102	1	Name of the organization
102	2	Main activities and services
102	3	Location of headquarters
102	4	Location of operations
102	5	Ownership and legal form
102	6	Markets served
102	7	Scale of the organization
102	8	Information on employees and other workers
102	9	Supply chain
102	10	Significant changes to the organization and supply chain
102	11	Precautionary principle
102	12	External initiatives
102	13	Membership of associations
STRATEGY		
102	14	Statement from senior decision-maker
102	15	Key impacts, risks and opportunities
ETHICS AND INTEGRITY		
102	16	Values, principles, standards and norms of behaviour
102	17	Mechanisms for advice and concerns about ethics
GOVERNANCE		
102	18	Governance structure
102	19	Delegating authority
102	20	Executive level responsibility on economic, environmental and social topics
102	22	Composition of the highest governance body and its committees
102	26	Role of highest governance body in setting purpose, values and strategy
102	29	Identifying and managing economic, social and environmental impacts
102	40	List of stakeholder groups
102	41	Collective bargaining agreements
102	42	Identifying and selecting stakeholders
102	43	Approach to stakeholder engagement
102	44	Key topics and concerns raised
REPORTING PRATICE		
102	45	Entities included in the consolidated financial statement
102	46	Defining report content and topic boundaries
102	47	List of material topics
102	48	Restatements of information
102	49	Changes in reporting

INDICATOR SECT.	INDICATOR NO.	INDICATOR DESCRIPTION
102	50	Reporting period
102	51	Date of most recent report
102	52	Reporting cycle
102	53	Contact point for questions regarding the report
102	54	Claims of reporting in accordance with the GRI standards
102	55	GRI content index
102	56	External assurance

ECONOMIC PERFORMANCE		
GRI 200 ECONOMIC PERFORMANCE		
103	1,2,3	Management approach
203	1	Infrastructure investment and services supported
GRI 204 PROCUREMENT PRACTICES		
103	1,2,3	Management approach
204	1	Proportion of spending on local suppliers
ANTI-CORRUPTION		
103	1,2,3	Management approach
205	1	Operations assessed for risks related to corruption
205	2	Communication and training about anti-corruption policies and procedure
205	3	Confirmed incidents corruption and actions taken
ANTI-COMPETITIVE BEHAVIOR		
206	1	Legal actions for anti-competitive behaviour, antitrust and monopoly practices
TAX		
103	1,2,3	Management approach
207	1	Approach to tax
207	2	Tax governance, control and risk management
207	3	Stakeholder engagement and management of concerns related to tax
207	4	Country-by-country reporting

ENVIRONMENT		
ENERGY		
302	1	Energy consumption within the organization
302	2	Energy consumption outside of the organization
302	4	Reduction of energy consumption
WATER		
303	5	Water consumption
EMISSIONS		
305	1	Direct (scope 1) GHG emissions
305	2	Energy indirect (scope 2) GHG emissions
305	4	GHG emissions intensity
305	5	Reduction of GHG emissions
WASTE		
306	1	Waste generation and significant waste-related impacts
306	2	Management of significant waste-related impacts
306	3	Waste generated
306	4	Waste diverted from disposal
306	5	Waste directed to disposal

INDICATOR SECT.	INDICATOR NO.	INDICATOR DESCRIPTION
ENVIRONMETAL COMPLIANCE		
103	1,2,3	Management approach
307	1	Non-compliance with environmental laws and regulations
PERFORMANCE SOCIALE		
EMPLOYMENT		
401	1	New employee hires and employee turn over
401	3	Parental leave
GRI 402 LABOUR/MANAGEMENT RELATIONS		
103	1,2,3	Management approach
G4 fp3	Fp3	Percentage of working time lost due to strikes
OCCUPATIONAL HEALTH AND SAFETY		
403	1	Occupational health and safety management system
403	2	Hazard identification, risk assessment and incident investigation
403	3	Occupational health services
403	4	Worker participation, consultation and communication on occupational health and safety
403	5	Worker training on occupational health and safety
403	6	Promotion of worker health
403	7	Prevention and mitigation of occupational health and safety impacts directly linked by business relationships
403	8	Workers covered by an occupational health and safety management system
403	9	Work-related injuries
403	10	Work-related ill health
TRAINING AND EDUCATION		
404	1	Average hours of training per year per employee
404	2	Programs for upgrading employee skills and transition assistance programs
404	3	Percentage of employees receiving regular performance and career development reviews
DIVERSITY AND EQUAL OPPORTUNITY		
405	1	Diversity of governance bodies and employees
NON-DISCRIMINATION		
406	1	Incidents of discrimination and corrective actions taken
SUPPLIER SOCIAL ASSESSMENT		
414	2	Social negative impacts in the supply chain and actions taken
CUSTOMER HEALTH AND SAFETY		
416	1	Assessment of the health and safety impacts of product and service categories
416	2	Incidents of non-compliance concerning impacts on products and services
MARKETING		
417	2	Incidents of non-compliance concerning service information
417	3	Incidents of non-compliance concerning marketing communications
CUSTOMER PRIVACY		
418	1	Substantial complaints concerning breaches of customer privacy and losses of customer data
SOCIO-ECONOMIC COMPLIANCE		
419	1	Non-compliance with laws and regulations in the social and economic area

COMMITTENTE:

Tarros S.p.A.

Via Privata Enel – 19126 La Spezia



Assessment of CO₂ Emissions from Maritime Transport **Technical Report**

DRAWN UP BY:



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SUMMARY

1. PREFACE AND PURPOSE.....	4
2. THE ROUTES COMPARED.....	5
3. MODES OF TRANSPORT, DESCRIPTION OF THE MEANS OF TRANSPORT	9
4. PARAMETERS FOR CALCULATING CO ₂ EMISSIONS	11
4.1. CO ₂ EMISSIONS FROM COMBUSTION.....	11
4.2. USEFUL CAPACITY OF SHIPS AND TRUCKS	13
4.3. SPECIFIC CONSUMPTION OF SHIPS AND TRUCKS	13
5. CO ₂ EMISSION ASSESSMENT FOR EACH ROUTE.....	15
5.1. CALCULATING CO ₂ EMISSIONS ON THE MILAN-LISBON ROUTE	15
5.2. CALCULATING CO ₂ EMISSIONS ON THE MILAN-ISTANBUL ROUTE	16
6. RESULT ANALYSIS	18
6.1. CO ₂ EMISSIONS ON THE MILAN-LISBON ROUTE	18
6.2. CO ₂ EMISSIONS ON THE MILAN-ISTANBUL ROUTE	20
7. ASSESSMENT VALIDATION	22
8. CONCLUSIONS	25
9. BIBLIOGRAPHY.....	26

INDEX OF FIGURES

Figure 1: Analysed routes	5
Figure 2: Distances in kilometres of the land routes	6
Figure 3: Distances in nautical miles of the maritime routes	7
Figure 4: Solutions studied for the Milan-Lisbon route	7
Figure 5: Solutions studied for the Milan-Istanbul route	8
Figure 6: LOLO container ship – Vento di Scirocco (VDS)	9
Figure 7: RORO vessel – Wedellsborg (WED)	10
Figure 8: Vessel Technical Specifications – Vento Di Scirocco (VDS) and Wedellsborg (WED)	10
Figure 9: Container truck	10
Figure 10: Conversion factors of fuels	11
Figure 11: Conversion factors of fuels	12
Figure 12: Ship fuel consumption	14
Figure 13: Calculation of VLSFO consumption per nautical mile	14
Figure 14: Calculation of MGO consumption during loading phase	14
Figure 15: Milan-Lisbon, calculation of CO ₂ emission from road transport	15
Figure 16: Milan-Lisbon, calculation of CO ₂ emission from maritime transport	16
Figure 17: Milan-Istanbul, calculation of CO ₂ emission from road transport	16
Figure 18: Milan-Istanbul, calculation of CO ₂ emission from maritime transport	17
Figure 19: Milan-Lisbon, CO ₂ emissions calculated in the 4 Solutions	18
Figure 20: Milan-Lisbon, total CO ₂ emissions calculated in the 4 Solutions	19
Figure 21: Milan-Lisbon, contribution to CO ₂ emissions of the maritime and land routes	19
Figure 22: Milan-Istanbul, CO ₂ emissions calculated in the 4 Solutions	20
Figure 23: Milan-Istanbul, total CO ₂ emissions calculated in the 4 Solutions	20
Figure 24: Milan-Lisbon, contribution to CO ₂ emissions of the maritime and land routes	21
Figure 25: Summary table of the comparison on THETIS-MRV for LOLO ships	23
Figure 26: Summary table of the comparison on THETIS-MRV for RORO vessels	24
Figure 27: Comparison between CO ₂ emissions from LOLO ships and RORO vessels based on THETIS-MRV database	24

1. PREFACE AND PURPOSE

Tarros S.p.a. has been a shipping company in La Spezia since 1828 and is currently specialized in container shipping.

As part of its commitment to sustainability Tarros has carried out assessments of the carbon footprint of transport.

Tarros has entrusted Tecnoceo S.r.l. in Carrara with the task of performing a comparative study on CO₂ emissions from cargo transport on different routes using different modes of transport: maritime transport-related CO₂ emissions (container ships or RORO vessels) have been compared with road transport (trucks).

In particular this report explains the evaluations made of the comparative calculation of CO₂ emissions per 1 tonne of cargo transported from Milan to Lisbon and from Milan to Istanbul by a LOLO container ship operated by Tarros S.p.A and a RORO vessel of similar size not operated by Tarros S.p.A.

2. THE ROUTES COMPARED

The routes which have been compared are the Milan-Lisbon and Milan-Istanbul routes, both currently served by LOLO container ship operated by Tarros S.p.a. or RORO vessel not operated by Tarros S.p.a..

The transport of cargo from Milan to the final destination includes land transport to the port of loading, maritime transport to the port of unloading and land transport to the destination city: Lisbon or Istanbul.

The image below shows the maritime routes and solutions.



Figure 1: analysed routes

The port of origin for the LOLO container ship is Genoa, whereas under current market conditions the port of origin for the RORO vessels is Genoa if the port of destination is Lisbon and Trieste if the port of destination is Istanbul.

In the case of the transport to Lisbon, the container ships operated by Tarros arrive at the port of Setubal, a few kilometres from Lisbon, whereas RORO vessels unload their cargo in Valencia. From Valencia the cargo is then transported by truck to Lisbon, crossing the Iberian peninsula.

In the case of the transport to Istanbul, the port of destination for all the vessels is the port of Istanbul.

The 2 above mentioned modes of transport in relation to which CO₂ emissions have been calculated, namely Solution 1 and Solution 2, have been compared with other two: Solution 3 which analyses the case of a simulated transport by RORO vessel on the same route as the one served by the LOLO container ship operated by Tarros in order to directly compare emissions from the 2 specific vessels and Solution 4 which is relative to the road transport from Milan to destination.

The tables below show the distances of each maritime and land route respectively in kilometres and nautical miles.

Land routes	from	to	Kms	routes, towns	routes, road number
1)	Milan	Lisbon	2163	Turin, Grenoble, Montpellier, Narbona, Toulouse, Bayonne, Burgos, Salamanca	A4, E70, A43, A41, A49, A7, A9, A61, A64, AP1, E80, A23, A1
2)	Milan	Genoa	155		A7
3)	Milan	Trieste	416		A4
4)	Valencia	Lisbon	882	Manzanares, Pueblade Don Rodrigo, Badajoz	A3, E903, N430, A5, A6, A2
5)	Setubal	Lisbon	50		
6)	Milan	Istanbul	1991	Trieste, Zagreb, Belgrade, Sofia	
7)	Port of Istanbul	Istanbul	30		

Figure 2: Distances in kilometres of the land routes

Maritime routes	from	to	miles
1) LOLO	Genoa	Setubal	1165
2) RORO	Genoa	Valencia	511
3) RORO	Trieste	Istanbul	1157
4) LOLO	Genoa	Istanbul	1295

Figure 3: Distances in nautical miles of the maritime routes

The tables below show the modes of transport used in the different solutions analysed for transporting respectively to Lisbon and Istanbul.

Milan – Lisbon Transport			
Solution 1 – LOLO container ship	Solution 2 – RORO vessel	Solution 3 – RORO vessel on Tarros LOLO route	Solution 4 – land transport
<ul style="list-style-type: none"> ROAD TRANSPORT FROM MILAN TO GENOA TIME IN GENOA FOR LOADING OPERATIONS 21 HOURS (CONTAINERS $769 : 36 = 21$) MARITIME TRANSPORT FROM GENOA TO SETUBAL TIME IN SETUBAL FOR UNLOADING OPERATIONS 21 HOURS ROAD TRANSPORT FROM SETUBAL TO LISBON 	<ul style="list-style-type: none"> ROAD TRANSPORT FROM MILAN TO GENOA TIME IN GENOA FOR LOADING OPERATIONS 17 HOURS (TRAILERS $204 : 12 = 17$) MARITIME TRANSPORT FROM GENOA TO VALENCIA TIME IN VALENCIA FOR UNLOADING OPERATIONS 14 HOURS (TRAILERS $204 : 15$) ROAD TRANSPORT FROM VALENCIA TO LISBON 	<ul style="list-style-type: none"> LIKE SOLUTION 1, WITH TIMING AND LOADING CAPACITY RELATIVE TO A RORO VESSEL 	<ul style="list-style-type: none"> ROAD TRANSPORT FROM MILAN TO LISBON

Figure 4: Solutions studied for the Milan-Lisbon route

Milan-Istanbul Transport			
Solution 1 – LOLO container ship	Solution 2 – RORO vessel	Solution 3 – RORO vessel on Tarros LOLO route	Solution 4 – land transport
<ul style="list-style-type: none"> ROAD TRANSPORT FROM MILAN TO GENOA TIME IN GENOA FOR LOADING OPERATIONS 21 HOURS MARITIME TRANSPORT FROM GENOA TO ISTANBUL TIME IN ISTANBUL FOR UNLOADING OPERATIONS 21 HOURS ROAD TRANSPORT TO ISTANBUL FOR DELIVERY 	<ul style="list-style-type: none"> ROAD TRANSPORT FROM MILAN TO TRIESTE (FERRY PORT) TIME IN GENOA FOR LOADING OPERATIONS 21 HOURS MARITIME TRANSPORT FROM TRIESTE TO ISTANBUL TIME IN ISTANBUL FOR UNLOADING OPERATIONS 14 HOURS ROAD TRANSPORT TO ISTANBUL FOR DELIVERY 	<ul style="list-style-type: none"> LIKE SOLUTION 1, WITH TIMING AND LOADING CAPACITY RELATIVE TO A RORO VESSEL 	<ul style="list-style-type: none"> ROAD TRANSPORT FROM MILAN TO ISTANBUL

Figure 5: Solutions studied for the Milan-Istanbul route

3. MODES OF TRANSPORT, DESCRIPTION OF THE MEANS OF TRANSPORT

Hereinafter are the main features of the means of transport used for the transport simulation.

We start describing the vessels used in maritime transport, i.e. the LOLO container ship and the RORO vessel, then we describe the vehicles used for road transport.

In order to simulate the maritime transport 2 ships with similar dimensions have been selected. These 2 ships have similar dimensions and different loading capacity due to the type of vessel (container ship and RORO vessel). The ships being studied are:

- LOLO container ship VENTO DI SCIROCCO owned by Tarros S.p.A., Figure 6
- RORO vessel WEDELLSBORG (WED), Figure 7

Figure 8 shows the specific dimensions of the vessels which are similar, and the cargo carrying capacity which is different due to the different type of vessels

Figure 9 represents a container truck.



Figure 6: LOLO container ship – Vento di Scirocco (VDS)



Figure 7: RORO vessel – Wedellsborg (WED)

PORTACONTAINER VENTO DI SCIROCCO (2005)			RO/RO WEDELLBORG (2014)		
VOLUME	CAPACITA' VOLUMETRICA (TEU)	1529	VOLUME	CAPACITA' METRI LINEARI	2546
	EQUIVALENZA M3 (1 TEU=37 METRI CUBI)	56573		VOLUME IN M3 (1 TRAILER = 125 M3)	25500
PORTATA	PORTATA TEU	1183	PORTATA	PORTATA TRAILER	204
	PORTATA LORDA IN TONS (1 TEU=14 TONS)	16562		PORTATA LORDA IN TONS (1 TRAILER=35 TONS)	7140
	PORTATA NETTA MERCE IN TONS (1 TEU = 12 TONS)	14196		PORTATA NETTA MERCE IN TONS (1 TRAILER = 25 TONS)	5100
		VDS +122%			VDS +132%
					VDS +178%

Figure 8: Vessel Technical Specifications – Vento Di Scirocco (VDS) and Wedellsborg (WED)



4. PARAMETERS FOR CALCULATING CO₂ EMISSIONS

4.1. CO₂ EMISSIONS FROM COMBUSTION

In order to calculate total CO₂ emissions in relation to the different routes it is necessary to estimate the quantity of fuel consumed by the different means used to transport goods to destination taking into account the different compared solutions.

The conversion factors allow to determine CO₂ emissions from the combustion of different fuels into the atmosphere.

In our case the CO₂ emission is equal to:

$$CO_2e = \sum C_i * FC_i$$

where:

- "i" is a number depending on the number of the types of fuel utilized on the routes (in our case "i"=3: diesel fuel/VLSFO/MGO);
- C_i is the quantity of the fuel "i" consumed;
- FC_i is the conversion factor of fuel "i".

In our case the ships use VLSFO380 (*Very Low Sulphur Fuel Oil*) during navigation and MGO (*Marine Gas Oil*) during the loading phase, whereas trucks use diesel fuel.

The tables below, taken from different websites, show the conversion factors of different fuels. The first table has been taken from the website <https://www.sunearthtools.com/it/tools/CO2-emissions-calculator.php> and the second one from the website <https://www.ssb.no/attachment/288060/binary/93858?version=539789>.

Fuel	Combustion Formula	Energy kcal (MJ)	CO ₂ kg (lb) emissions
Petrol gasoline	2 C ₈ H ₁₈ + 25 O ₂ → 16 CO ₂ + 18 H ₂ O + 2039 kcal	0.7187 kg/l (5.973 lb/gal)	2.3020 kg/l (19.24 lb/gal)
Diesel	4 C ₁₂ H ₂₆ + 71 O ₂ → 48 CO ₂ + 46 H ₂ O + 19849 kcal	0.8502 kg/l (5.943 lb/gal)	2.6256 kg/l (21.91 lb/gal)
LPG GPL	C ₃ H ₈ + 5 O ₂ → 3CO ₂ + 4 H ₂ O + 521 kcal	0.52 kg/l (4.34 lb/gal)	0.9 kg/l (25.04 lb/gal)
methane CH ₄ (compressed natural gas) CH ₄	CH ₄ + 2 O ₂ → CO ₂ + 2 H ₂ O + 891 kcal/mol	0.415 kg/l (3.47 lb/gal)	0.7502 kg/l (22.90 lb/gal)
ethanol CH ₃ OH	CH ₃ OH + 3/2 O ₂ → CO ₂ + 2 H ₂ O + energy	0.7952 kg/l (4.53 lb/gal)	1.275 kg/l (11.47 lb/gal)
ethanol C ₂ H ₅ OH	C ₂ H ₅ OH + 3 O ₂ → 2 CO ₂ + 3 H ₂ O + energy	0.788 kg/l (5.58 lb/gal)	1.505 kg/l (12.57 lb/gal)
woodfuel C ₆ H ₁₀ O ₂	C ₆ H ₁₀ O ₂ + (50/2) O ₂ → 15 CO ₂ + 17 H ₂ O + energy	0.881 kg/l (7.40 lb/gal)	2.201 kg/l (25.69 lb/gal)
woodfuel C ₆ H ₁₀ O ₂	C ₆ H ₁₀ O ₂ + 29 O ₂ → 20 CO ₂ + 20 H ₂ O + energy	0.884 kg/l (7.38 lb/gal)	2.916 kg/l (23.5 lb/gal)

Figure 10: conversion factors of fuels

Emission factors used in the estimations of emissions from combustion									
In the calculations the numbers are used with the highest available accuracy. In these tables though, they are only shown rounded off.									
In the tables, dotted cells indicate combinations of fuel and source without consumption.									
CO ₂ , SO ₂ and heavy metals - Stationary and mobile combustion									
Table B1. General emission factors for CO ₂ , SO ₂ and heavy metals									
	CO ₂ tonne/tonne ²	SO ₂ ¹ kg/tonne ²	Pb g/tonne ²	Cd g/tonne ²	Hg g/tonne ²	As g/tonne ²	Cr g/tonne ²	Cu g/tonne ²	
Coal	2.52	16 ²	0.2 ²	0.003 ²	0.05 ²	0.049 ²	0.065 ²	0.087 ²	
Coke	3.19	18	0.2 ²	0.003 ²	0.05 ²	0.089 ²	0.065 ²	0.087 ²	
Pebble coke	3.09	18	0.2	0.003	0.05	0.089	0.065	0.087	
Charcoal	0	0.32	0.8	0.38	0.02	0.01	0.68	0.18	
Motor gasoline	3.13	0.001	0.03 ⁴	0.01	0.0084	0.05	0.05	1.7	
Aviation gasoline	3.13	0.4	0.75.7	0.01	0	0.05	0.05	1.7	
Kerosene (heating)	3.15	0.346	0.07	0.01	0.03	0.08	0.04	0.06	
Jet kerosene	3.15	0.274	0.07	0.01	0.03	0.05	0.05	0.05	
Auto diesel	3.17 ³	0.015 ⁴	0.1	0.01	0.0023	0.05	0.05	1.7	
Marine gas oil/diesel	3.17	1.159	0.1	0.01	0.05	0.05	0.04	0.06	
Light fuel oils	3.17	0.928	0.1	0.01	0.05	0.05	0.04	0.05	
Heavy distillate	3.17	4.375	0.1	0.01	0.05	0.05	0.04	0.05	
Heavy fuel oil	3.2	17.04 ¹	1	0.1	0.2	0.057	1.35	0.53	
Natural gas (1000 Sm ³)	1.99/2.34 ²	0	0.00025	0.002	0.001	0.004	0.021	0.016	
LPG	3	0	0	0	0	0.004	0.021	0.016	
Refinery gas	2.8	0	0	0	0	0.004	0.021	0.016	
CO gas	1.571	0	0	0	0	0.004	0.021	0.016	
Fuel gas	2.5	0	0	0	0	0.004	0.021	0.016	
Landfill gas	0	0.019	0	0	0	0.004	0.021	0.016	
Biogas	0	0	0.00025	0.0017	0.001	0.0038	0.021	0.016	
Fuel wood	0	0.2	0.05	0.1	0.010244	0.159	0.152	0.354	
Wood waste	0	0.37	0.05	0.1	0.010244	0.159	0.152	0.354	
Wood pellets	0	0.37	0.05	0.1	0.1	0.159	0.152	0.354	
Wood briquettes	0	0.37	0.05	0.1	0.1	0.159	0.152	0.354	
Black liquor	0	0.37	0.05	0.1	0.010244	0.159	0.152	0.354	
Municipal waste	0.5498 ⁵	1.4	0.00304	0.00015	0.00016	0.022	0.001	0.00085	
Special waste	3.2	9.2	14	0.6	0.2	1	31	25	

¹ Applies to 2015 for petroleum products; the factors change yearly, in accordance with changes in the sulphur content in the products.
² For natural gas: 1000 Sm³
³ Exceptions: Direct-fired furnaces in cement production = 0.1 and small stoves in households = 20
⁴ From 1997 - considerably higher earlier years. Earlier used factors are not shown in the Appendix.
⁵ From 2006 the emission factor has been converted for use of bio diesel, which not causes emissions of CO₂: 2006: 1.148, 2007: 1.114, 2008: 1.029, 2009: 1.007, 2010: 2.062, 2011: 3.006, 2012: 2.880, 2013: 2.060, 2014: 3.000, 2015: 2.000.
⁶ Applies to road traffic. Weighted average of duty-free and taxable auto diesel.
⁷ Stationary combustion.
⁸ Respectively dry gas (domestic use) and rich gas (industrial shell).
⁹ The factor increases through the period, from 0.4874 in 1990. Exact figures can be given at request.
 Numbers in *italics* have exceptions for some sectors, see table B2 and B5. Bold numbers are different for different years, see table B3, B4 and B5.
 Source: Roslund (1987), Norwegian pollution control authority (1990), Sanzgiri et al. (1998), Finstad et al. (2001) Finstad et al. (2002) and Finstad and Rydgren (2003).

Figure 11: conversion factors of fuels

The emission factors used in the calculations are the following:

1. diesel fuel – 3.17 kg/l
2. VLSFO380 – 3.17 kg/l
3. MGO - 3.17 kg/l

4.2. USEFUL CAPACITY OF SHIPS AND TRUCKS

In order to compare the performances of the different transport Solutions we have referred to the value of CO₂ emissions per 1 tonne of cargo transported from origin to destination.

For this purpose it is necessary to assess the useful capacity of the different means of transport already shown in Figure 8.

The LOLO container ship VDS of Tarros has a useful capacity of 355 20ft containers and 414 40ft containers with a total carrying capacity of 14,196 tons, on average 18.46 tonnes per container.

The RORO vessel WED has a useful capacity of 204 25-ton trailers with a total carrying capacity of 5,100 tonnes, on average 25 tonnes per container.

4.3. SPECIFIC CONSUMPTION OF SHIPS AND TRUCKS

In order to compare emissions as regards the different solutions of transport it is necessary to assess the emissions by determining the total fuel consumption per 1 tonne of cargo transported from origin to destination.

As regards consumptions of trucks, the following specific consumption has been taken into account, according to Tarros experience:

- 3.4 km/lt of diesel fuel necessary to transport 1 container/trailer, as regards both a container weighing 18.46 tonnes on average and a trailer weighing 25 tonnes

As regards ship consumptions, the values below have been considered. VLSFO380 (*Very Low Sulphur Fuel Oil*) is used during navigation and MGO (*Marine Gas Oil*) during the loading phase.

LO / LO container ship
Maritime Transport:
Fuel consumption during navigation: VLSFO380- 22 t/day
Fuel consumption during the loading phase: MGO – 2.5 t/day (estimated)
RO / RO vessel
Maritime Transport: speed 16 knots
Fuel consumption during navigation: VLSFO380 - 30 t/day
Fuel consumption during the loading phase: MGO – 2.5 t/day (<i>estimated</i>)

Figure 12: Ship fuel consumption

As regards the ships, the unit consumption per nautical mile and the total consumption during the loading phase have been calculated based on the daily consumption during navigation and during loading operations. The tables below show the consumptions.

CONSUMO	VLSFO / 1 Miglio LO / LO	VLSFO / 1 Miglio RO / RO
VLSFO380	0,056885092	0,067874258
Miglia	1	1
Nodi	14	16
Ore	0,062056464	0,054299406
Giorni	0,002585686	0,002262475
TonlFO/gg	22	30

Figure 13: Calculation of VLSFO consumption per nautical mile

CONSUMO MGO/Caricamento	LO / LO	RO / RO
Consumo MGO Giorno, Ton	2,5	2,5
Durata Carico e Scarico, h	42	31
Consumo MGO, Ton	4,375	3,229

Figure 14: Calculation of MGO consumption during loading phase

5. CO₂ EMISSION ASSESSMENT FOR EACH ROUTE

Once defined the routes and the land and maritime transport Solutions, the relative length in kilometres and miles as well as the capacity of the means of transport and their relative consumptions, it is possible to calculate the total consumption of each type of fuel and the relative CO₂ emission. As previously indicated, the total amount of CO₂ emitted is equal to the sum of the CO₂ emitted from each means of transport per tonne of cargo transported from origin to destination.

5.1. CALCULATING CO₂ EMISSIONS ON THE MILAN-LISBON ROUTE

The CO₂ emissions on the Milan–Lisbon route in the different solutions consist of a component due to land transport and a component due to maritime transport.

As for the component of emissions from land transport, it depends on the consumption necessary for transporting the cargo by truck from origin to destination or to the loading port plus the consumption during port operations and consumption from the unloading port to destination.

With reference to the length of the routes as described in paragraph 2 and the indicated specific consumptions as well as the useful capacity of the means of transport as described in paragraph 4, we can calculate the amount of CO₂ emitted into the atmosphere in kgCO₂eq/Tonne of cargo transported. Table 15 below shows the calculation.

Emissioni CO ₂ Trasporto su Gomma e Movimentazione Portuale		Soluzione 1 - Trasporto con Nave portacontainer (i.O.L.O.) Milano/Genova/ Setúbal/Lisbona	Soluzione 2 - Trasporto con nave traghetto (RORO) Milano/Genova/ Valencia/Lisbona	Soluzione 3 - Trasporto con nave RORO su percorso = i.O.L.O. Milano/Genova/ Setúbal/Lisbona	Soluzione 4 - Trasporto Tutto Gomma Milano/Lisbona
Distanza stradale in Km tratte	km	205	1017	205	216,8
Distanza movimentazione container portuale (1km ³ Nri Container/TonM Km		2	2	2	
Consumo medio diesel trasporto stradale: 1,4 km/litro	km/litro	1,4	1,4	1,4	1,4
Consumo totale diesel per trasporto su strada e movimentazione	litri	60,882	305,588	60,882	636,176
Capacità Netta Merce Container	ton	18,40	21,00	21,00	21,00
CO ₂ Emission (1 litro di Diesel produce 3 kg di CO ₂)	kgCO ₂ e/lt	3,170	3,170	3,170	3,170
CO ₂ Immissa nell'atmosfera su strada e movimentazione banchina	kg CO ₂ e/TonMerce	10,455	38,749	7,720	80,667

Figure 15: Milan-Lisbon, calculation of the CO₂ emission from road transport

As for the component of emissions from maritime transport, it depends on the consumption necessary for transporting the cargo by ship from the loading port to the port of destination. With reference to the length of the routes as described in paragraph 2 and the indicated specific consumptions as well as the useful capacity of the means of transport as described in paragraph 4, we can calculate the amount of CO₂ emitted into the atmosphere in kgCO₂eq/Tonne of cargo transported. Table 16 below shows the calculation.

Emissioni CO ₂ Trasporto Tratta Mare		Soluzione 1 - Trasporto con Nave portacontainer (LOLO)	Soluzione 2 - Trasporto con nave traghetto (RORO)	Soluzione 3 - Trasporto con nave RORO su percorso = LOLO	Soluzione 4 - Trasporto Tutto Gomma
		Milano/Genova/ Setubal/Lisbona	Milano/Genova/ Valencia/Lisbona	Milano/Genova/ Setubal/Lisbona	Milano/Lisbona
lunghezza tratta	Miglia	1.165,000	511,000	1.165,000	
Carburante tipo VLSFO 380 consumato nella tratta	Ton	66,271	34,684	79,074	
CO ₂ Emission (1 ton of VLSFO 380 produce X kg of CO ₂ e)	kg CO ₂ e/Ton BFO	3.170,00	3.170,00	3.170,00	
Carburante tipo MGO 100 consumato durante carico scarico	Ton	4,175	4,279	4,279	
CO ₂ Emission (1 litre of MGO produce X kg of CO ₂)	kg CO ₂ e/ton	3.170,00	3.170,00	3.170,00	
Emissione CO ₂ totale tratta	kg CO ₂ e	223.948,239	170.183,937	260.299,405	
Capacità in Tonnellate di merce trasportata	TON	14.196	5.100	5.100	
Emissione CO ₂ Tratta/TonMerce	kg CO ₂ e/TonMerce	15,775	23,565	51,157	

Figure 16: Milan-Lisbon, calculation of the CO₂ emission from maritime transport

5.2. CALCULATING CO₂ EMISSIONS ON THE MILAN-ISTANBUL ROUTE

As mentioned above, the CO₂ emissions on the Milan-Istanbul route in the different solutions consist of a component due to land transport and a component due to maritime transport.

As for the component of emissions from land transport, it depends on the consumption necessary for transporting cargo by truck from origin to destination or to the loading port plus the consumption during port operations and the consumption from the unloading port to destination.

With reference to the length of the routes as described in paragraph 2 and the indicated specific consumptions as well as the useful capacity of the means of transport as described in paragraph 4, we can calculate the amount of CO₂ emitted into the atmosphere in kgCO₂e/Tonne of cargo transported.

The table below shows the calculation.

Figure 17: Milan-Istanbul, calculation of the CO₂ emission from road transport

Emissione CO ₂ Trasporto su Gomma e Movimentazione Portuale		Soluzione 1 - Trasporto con Nave portacontainer (LOLO)	Soluzione 2 - Trasporto con nave traghetto (RORO)	Soluzione 3 - Trasporto con nave RORO su percorso = LOLO	Soluzione 4 - Trasporto Tutto Gomma
		Milano/Genova/ Istanbul	Milano/Trieste/ Istanbul	Milano/Genova/ Istanbul	Milano/Istanbul
Distanza stradale in Km tratta	km	185	446	185	1991
Distanza movimentazione container portuale (1km Tm Container/TonM Km)		2	2	2	
Consumo medio diesel trasporto stradale 1,4 km/litro	km/litro	1,4	1,4	1,4	1,4
Consumo totale diesel per trasporto su strada e movimentazione	litri	55,000	131,765	55,000	585,588
Capacità Netta Merce Container	Ton	18,46	25,00	25,00	25,00
CO ₂ Emission (1 litro di Diesel produce X kg of CO ₂)	kg CO ₂ e/t	3.170	3.170	3.170	3.170
CO ₂ Immissione nell'atmosfera su strada e movimentazione banchina	kg CO ₂ e/TonMerce	5,445	16,708	6,974	74,253

As for the component of emissions from maritime transport, it depends on the consumption necessary for transporting the cargo by ship from the loading port to the port of destination.

With reference to the length of the routes as described in paragraph 2 and the indicated specific consumptions as well as the useful capacity of the means of transport as described in paragraph 4, we can calculate the amount of CO₂ emitted into the atmosphere in kgCO₂eq/tonne of cargo transported.

The table below shows the calculation.

Figure 18: Milan-Istanbul, calculation of the CO₂ emission from maritime transport

Emissioni CO ₂ Trasporto Tratta Mare		Soluzione 1 - Trasporto con Nave portacontainer (LOLO) Milano/Genova/ Istanbul	Soluzione 2 - Trasporto con nave traghetto (RO-RO) Milano/Trieste/ Istanbul	Soluzione 3 - Trasporto con nave RO-RO su percorso = LOLO Milano/Genova/ Istanbul	Soluzione 4 - Trasporto Tutto Gomma Milano/Istanbul
lunghezza tratta	Miglia	1.295,000	1.157,000	1.295,000	
Carburante tipo VLSFO 380 consumato nella tratta	Ton	73,666	78,531	79,074	
CO ₂ Emission (1 ton of VLSFO 380 produce X kg of CO ₂ e)	kg CO ₂ e/Ton (FO)	3.170,00	3.170,00	3.170,00	
Carburante tipo MGO 900 consumato durante carico scarico	Ton	4,175	4,774	4,774	
CO ₂ Emission (1 litre of MGO produce X kg of CO ₂)	kg CO ₂ e/Ton	3.170,00	3.170,00	3.170,00	
Emissione CO ₂ totale tratta	kg CO ₂ e	247.340,586	259.178,194	260.899,405	
Capacità in Tonnellate di merce trasportata	TON	14.196	5.100	5.100	
Emissione CO₂ Tratta/TonMerca	kgCO₂e/TonMerca	17,427	50,819	51,157	

6. RESULT ANALYSIS

The tables below show the total CO₂ emissions on the routes analysed in the different transport Solutions in terms of *kilograms of CO₂ equivalent per Tonne of cargo transported* (kgCO₂eq/Tonne).

It is to underline that Solution 1 (transport by container ship operated by Tarros S.p.a.) is the solution with the lowest CO₂ emission estimated in kgCO₂eq/Tonne of cargo transported as regards both routes.

The lower impact of Solution 1 (transport by container ship operated by Tarros S.p.a.) is due both to the shorter length/minor incidence of land transport, which has the highest specific emissions, and the higher efficiency of the maritime transport by LOLO container ship compared to RORO vessel.

The LOLO container ship, due to its higher loading capacity produces much lower CO₂ emissions estimated in kgCO₂eq/Tonne of cargo transported compared to the RORO vessel.

The higher efficiency of the LOLO container ship compared to a RORO vessel is easily explained by comparing the emissions in Solution 1 and Solution 3. Solution 3 is not a current trading route and represents a theoretical assessment of CO₂ emissions if a RORO vessel were used on the same route operated by Tarros with containership.

6.1. CO₂ EMISSIONS ON THE MILAN-LISBON ROUTE

The tables below show the total emissions of CO₂ equivalent per 1 tonne of cargo transported from origin to destination on the Milan–Lisbon route.

EMISSIONI TOTALI TRATTA		Soluzione 1 - Trasporto con Nave portacontainer (LOLO) Milano/Genova/ Setúbal/Lisbona	Soluzione 2 - Trasporto con nave traghetto (RORO) Milano/Genova/ Valencia/Lisbona	Soluzione 3 - Trasporto con nave RORO su percorso = LOLO Milano/Genova/ Setúbal/Lisbona	Soluzione 4 - Trasporto Tutto Gomma Milano/Lisbona
Emissioni CO ₂ Trasporto Terra e Movimentazione Portuale	kgCO ₂ e/TonMerce	10,455	38,740	7,770	380,667
Emissioni CO ₂ Trasporto Marittimo	kgCO ₂ e/TonMerce	15,775	23,565	51,157	0,000
CO ₂ TOTALE EMessa PER TRASPORTO DI 1 TON MERCE		26,230	62,304	58,927	380,667

Figure 19: Milan-Lisbon, CO₂ emissions calculated in the 4 Solutions

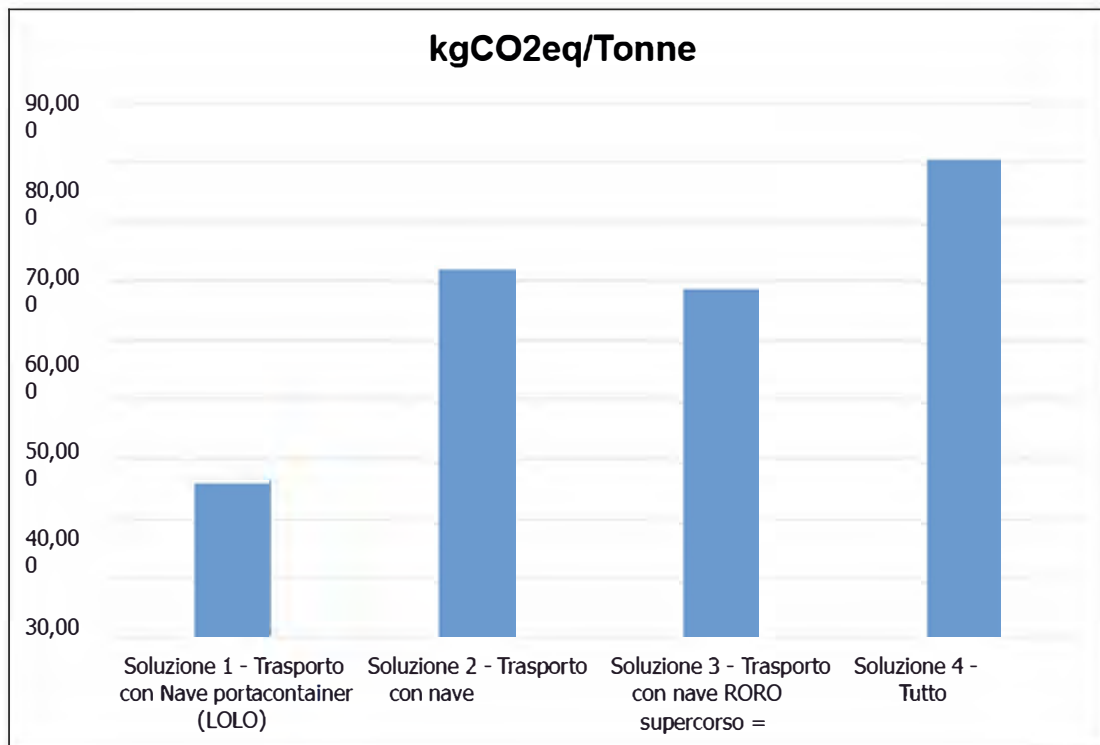


Figure 20: Milan-Lisbon, total CO₂ emissions calculated in the 4 Solutions

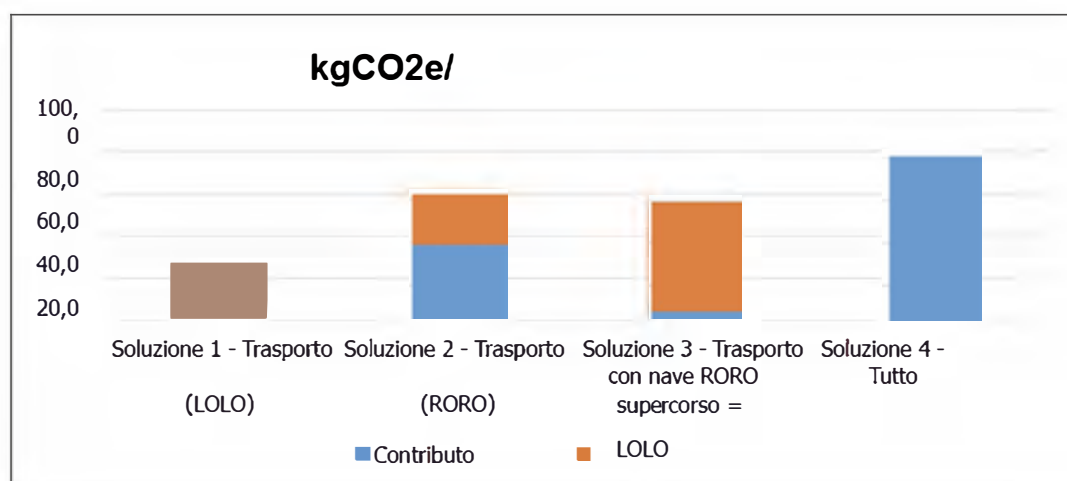


Figure 21: Milan-Lisbon, contribution to CO₂ emissions of the maritime and land routes

6.2. CO₂ EMISSIONS ON THE MILAN-ISTANBUL ROUTE

The tables below show the total emissions of CO₂ equivalent per 1 tonne of cargo transported from origin to destination on the Milan–Istanbul route.

EMISSIONI TOTALI TRATTA		Soluzione 1 - Trasporto con Nave portacontainer (LCL)	Soluzione 2 - Trasporto con nave traghetto (RORO)	Soluzione 3 - Trasporto con nave RORO su percorso = LCL	Soluzione 4 - Trasporto Tutto Gomma
		Milano/Genova/ Istanbul	Milano/Trieste/ Istanbul	Milano/Genova/ Istanbul	Milano/Istanbul
Emissioni CO ₂ Trasporto Terra e Movimentazione Portuale	kgCO ₂ e/TonMerce	9,645	16,708	6,974	74,254
Emissioni CO ₂ Trasporto Marittimo	kgCO ₂ e/TonMerce	17,427	50,819	51,157	0,000
CO₂ TOTALE EMESSE PER TRASPORTO DI 1 TON MERCE		28,671	67,527	58,131	74,254

Figure 22: Milan-Istanbul, CO₂ emissions calculated in the 4 Solutions

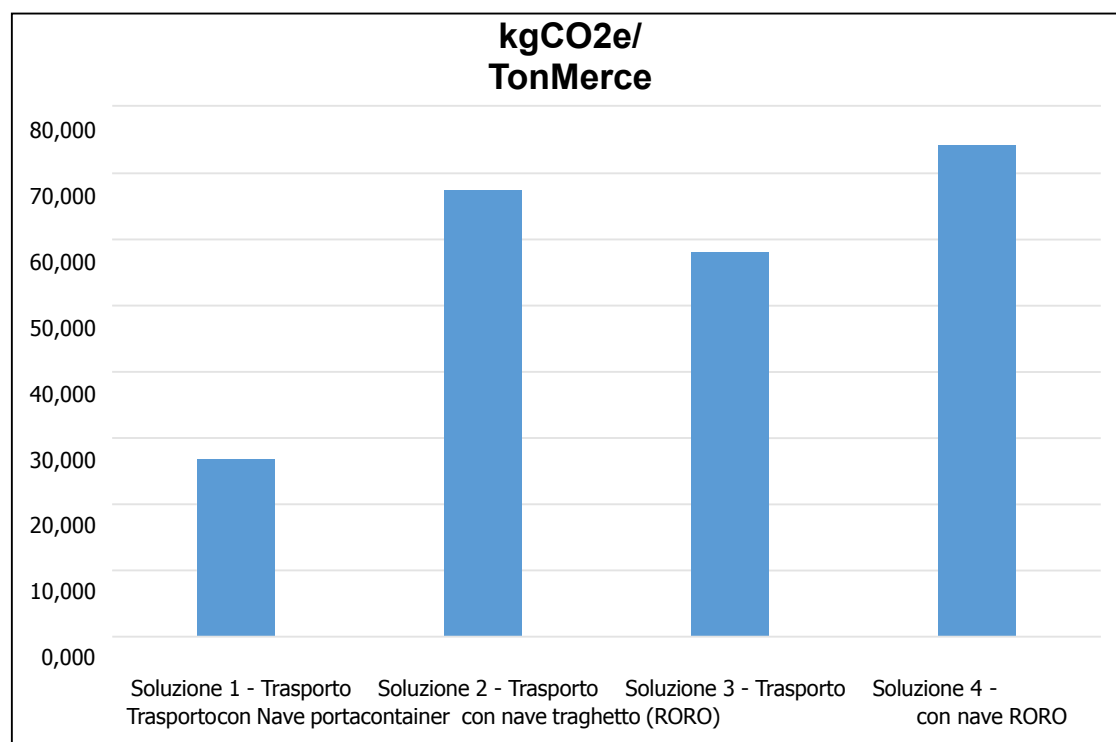


Figure 23: Milan-Istanbul, total CO₂ emissions calculated in the 4 Solutions

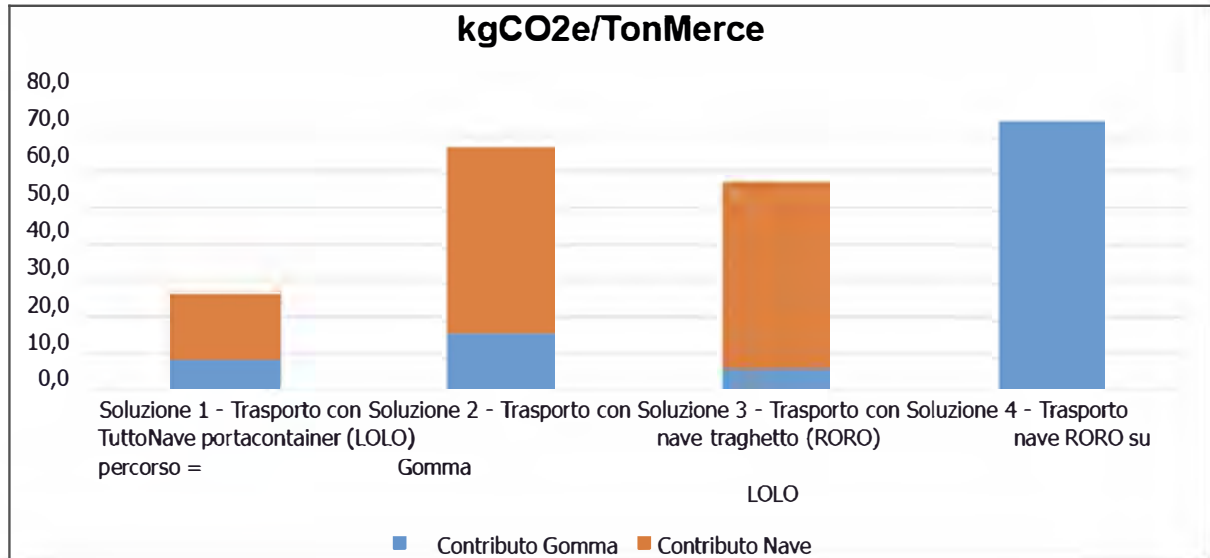


Figure 24: Milan-Lisbon, contribution to CO₂ emissions of the maritime and land routes

7. ASSESSMENT VALIDATION

In order to validate this report, a cross-analysis has been carried out utilizing the websites <https://mrv.emsa.europa.eu/#public/emission-report> and <https://www.vesselfinder.com/>. as references.

The first website, THETIS-MRV, owned by EMSA (European Maritime Safety Agency), was created to support the implementation of the Regulation EU 2015/757 (or MRV regulation). This regulation is an important step towards decarbonization of the maritime transport sector which according the last environmental report by EMSA produces 13.5% of all greenhouse gas emissions from transports in the EU.

THETIS-MRV also supports verifiers in the issuance of the Document of Compliance and flag states with a platform for consultation of emission reports. It allows all relevant parties to fulfil their obligations in a centralized and harmonized way. All emission reporting data are publicly available.

On this website the shipowner or any other organisation or person that has assumed responsibility for the operation of the ship can voluntarily report CO₂ emissions from ships in compliance with MRV regulation.

THETIS-MRV provides a section relative to the CO₂ emission reports through the following search filters:

- IMO number
- ship name
- CO₂ emission reporting period
- Ship type

The second website, VesselFinder, displays real time ship positions and marine traffic. It avails itself of the contribution of users who can connect their AIS (Automatic Identification System), to VesselFinder. Among the features of this website are the search of the vessel by using IMO number and name in order to obtain detailed information on the vessel: name, flag, type, destination, draft, route, speed, gross tonnage, year of construction, dimensions and travelled routes subdivided by year.

Our analysis is based on the most recent emission reports relative to 2021 from LOLO container ships and RORO vessels.

After obtaining the list of vessels, we have carried out a cross-search on VesselFinder website entering the IMO number and only selecting those vessels with similar gross tonnage and similar routes as the ships operated by Tarros S.p.A. and analysed in this report.

The tonnage has been set in a range from 16,000 to 22,000 tonnes for LOLO ships and from 20,000 to 24,000 tonnes for RORO vessels. As regards routes, short sea shipping ships have been selected, that is ships sailing in the Mediterranean Sea.

Based on the previously mentioned criteria, 6 LOLO ships and 6 RORO vessels have been chosen, among which VENTO DI SCIROCCO owned by Tarros S.p.A. and WEDELLSBORG.

The website THETIS-MRV reports annual average CO₂ emissions expressed in "gCO₂/m tonnes · n miles". In order to obtain data comparable with the results of our calculations, we have multiplied that annual average by the routes, in nautical miles (nm), travelled by the vessels concerned:

- Genoa–Setubal and Genoa–Istanbul, for LOLO container ships;
- Genoa–Valencia and Trieste–Istanbul for RORO vessels.

The result of the operation has been converted into kgCO₂, obtaining an average in kgCO₂/m tonne.

It is to underline that the units of measure relative to tonnage are repeatedly expressed in "m tonnes" which is referred to as the "metric ton". We use this term because the websites from which we have extrapolated the data can be used by any nation and consequently errors may occur in converting data, since states do not use the same systems of measurement in kilograms. We therefore specify that with "m tonnes" we mean metric ton, which is equal to 1,000 kg.

The table below shows the results obtained.

NAVI PORTACONTAINER LO/ LO									
EMSA/THETIS-MRV						Genova - Setubal (1165 nm)		Genova - Istanbul (1295 nm)	
n° IMO	Name	Gross Tonnage	Ship type	Tratta (2021)	Annual average CO emissions per transport work (mass)[g CO / m tonnes · n miles]	² Annual average CO emissions [g CO / m tonnes]	² Annual average CO emissions [kg CO / m tonnes]	² Annual average CO emissions [g CO / m tonnes]	² Annual average CO emissions [kg CO / m tonnes]
9305893	MARGUERITE A	17665	Container ship	Italia - Turchia	22,01	25642	25,64	28503	28,50
9305908	VENTO DI SCIROCCO	17665	Container ship	Italia - Turchia	22,33	26014	26,01	28917	28,92
9141780	MSC GIANNINA	21531	Container ship	Italia - Turchia	26,41	30768	30,77	34201	34,20
9379351	VENTO DI TRAMONTANA	17687	Container ship	Italia - Portogallo	27,16	31641	31,64	35172	35,17
9337365	VENTO DI MAESTRALE	17687	Container ship	Italia - Portogallo	27,92	32527	32,53	36156	36,16
9845063	DJANET	16963	Container ship	Italia - Spagna	41,33	48149	48,15	53522	53,52

Figure 25: Summary table of the comparison on THETIS-MRV for LOLO ships

NAVI TRAGHETTO RO / RO									
EMSA/THETIS- MRV						Genova - Valencia (511 nm)		Trieste - Istanbul (1157 nm)	
n° IMO	Name	Gross Tonnage	Ship type	Tratta (2021)	Annual average CO emissions per transport work (mass) [g CO / m tonnes - n miles]	Annual average CO ₂ emissions [g CO ₂ /m tonnes]	Annual average CO ₂ emissions [kg CO ₂ /m tonnes]	Annual average CO ₂ emissions [g CO ₂ /m tonnes]	Annual average CO ₂ emissions [kg CO ₂ /m tonnes]
91085	EUROCARGO NAPOLI	21357	RO-RO ship	Italia - Grecia	103,64	52960	52,96	119914	119,91
96873 06	WEDELLSBORG	21801	RO-RO ship	Italia - Tunisia	107,77	55070	55,07	124690	124,69
97065 92	ROSA DEI VENTI	23937	RO-RO ship	Italia - Tunisia	122,81	62756	62,76	142094	142,09
92079 98	AMILCAR	22900	RO-RO ship	Tunisia - Francia	123,92	63323	63,32	143375	143,38
92080 07	ELYSSA	22900	RO-RO ship	Italia - Tunisia	147,29	75265	75,27	170415	170,41
96453 96	FRJSENBORG	21966	RO-RO ship	Italia - Tunisia	331,60	169448	169,45	383664	383,66

Figure 26: Summary table of the comparison on THETIS-MRV for RORO vessels

As we can see in the summary tables 25 and 26, the ships VENTO DI SCIROCCO and WEDELLSBORG, highlighted in bold, and the other vessels of the same category have the same order of magnitude in relation to CO₂ emissions.

The figure below shows a comparison which indicates CO₂ emissions calculated with this method on both routes. Based on the data available on this database we confirm that emissions from LOLO container ships are much lower compared to the ones from RORO vessels.

Emissions calculated according to THETIS-MRV database for the routes concerned are approximately 2 or 3 times higher compared to the results we have obtained, but the order of magnitude is the same, therefore we can infer that the calculations are reliable.

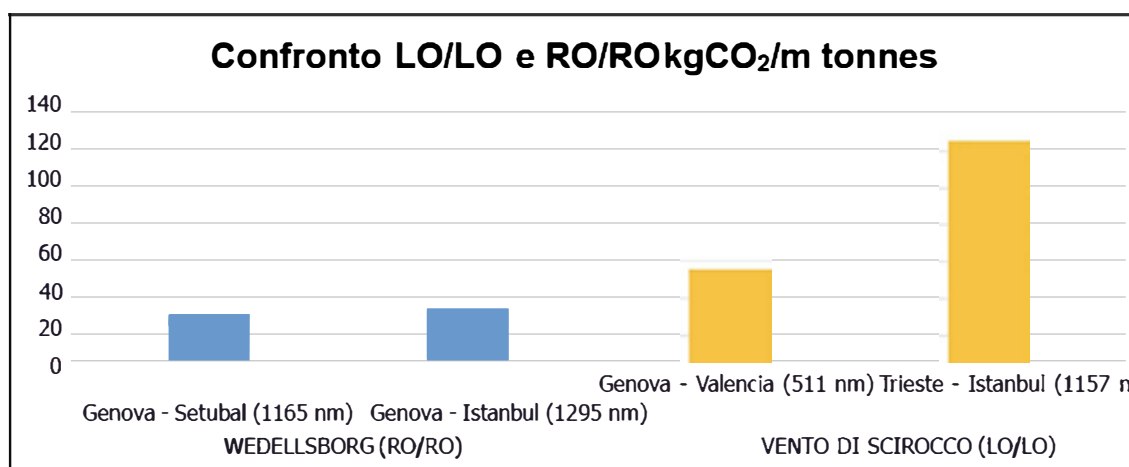


Figure 27: Comparison between CO₂ emission from LOLO ships and RORO vessels based on THETIS-MRV database

8. CONCLUSIONS

This report shows some comparative assessments of CO₂ emissions from cargo transport on different routes using different modes of transport (means of transport/routes).

In particular some assessments have been carried out which have allowed to determine CO₂ emissions per 1 tonne of cargo transported from Milan to Lisbon and from Milan to Istanbul with LOLO container ships operated by Tarros S.p.a. or RORO vessels not operated by Tarros S.p.a..

Assessments carried out on both trading routes have analysed 4 different transport solutions, in particular:

- Solution 1 – LOLO container ship
- Solution 2 – RORO vessel
- Solution 3 – RORO vessel on the same route as the LOLO container ship (simulated, not commercial)
- Solution 4 – Road transport only

It is to underline that Solution 1 (transport by container ship operated by Tarros S.p.a.) is the solution with the lowest CO₂ emission estimated in kgCO₂eq/Tonne of cargo transported as regards both routes.

The lower impact of Solution 1 (transport by container ship operated by Tarros S.p.a.) is due both to the shorter length/minor incidence of land transport, which has the highest specific emissions, and the higher efficiency of the maritime transport by LOLO container ship compared to a RORO vessel.

The LOLO container ship, due to its higher loading capacity produces much lower CO₂ emissions estimated in kgCO₂eq/tonne of cargo transported compared to the RORO vessel.

The higher efficiency of the LOLO container ship compared to RORO vessels is easily explained by comparing emissions in Solution 1 and Solution 3. Solution 3 is not a current trading route and represents a theoretical assessment of CO₂ emissions if a RORO vessel were used on the same route operated by Tarros with containership.

The results obtained have been compared with THETIS-MRV database and the values we have obtained are to be considered representative values.

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DESIGN AND LAYOUT

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