Autorità di Sistema Portuale
dei Mari Tirreno Meridionale
e Ionio

PORT SYSTEM ENERGY AND ENVIRONMENTAL PLANNING DOCUMENT FOR THE SOUTHERN TYRRHENIAN AND IONIAN SEAS - MTMI





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Contents and structure

- Regulatory framework of reference
- **Morphological/functional and institutional/programmer status**
- **Framework of CO_2 emissions of port system** according to UNI ISO 14064
- Identification of measures and interventions to reduce primary energy consumption
- **Feasibility assessment and cost-benefit analysis**
- Analysis of energy producibility from **renewable sources in the Port System**

Drafting of DEASP and the involvement of the Port Community

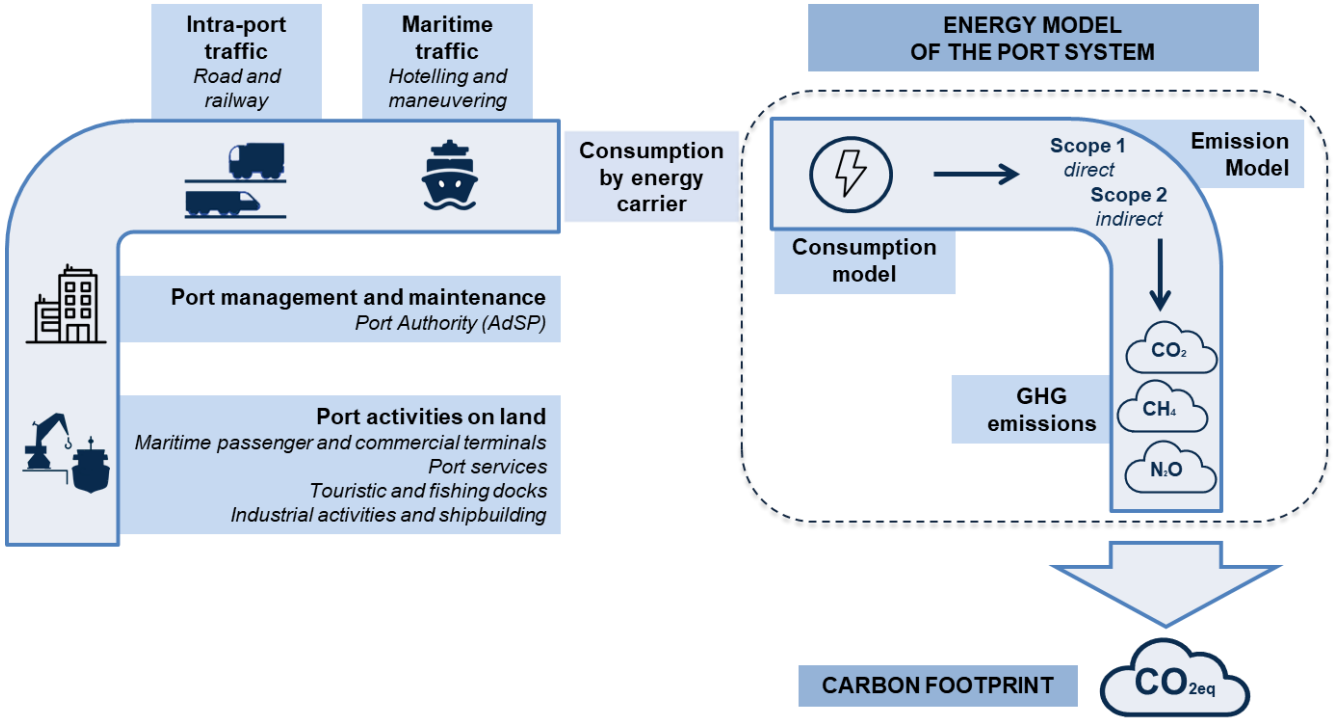
- 5 seminars with Port Authority and port dealers to show the aims and methods of carrying out the project

- Delivery of a survey to collect energy and environmental data

- 15 one-to-one meetings with the most energy-consuming operators within the Port System

Framework of CO_2 emissions of Port System

Goal: defining **CO_2 equivalents emissions** of the ports of the Port System of the Southern Tyrrhenian and Ionian Seas (MTMI), according to the UNI ISO 14064:2019.



Ports:
Gioia Tauro, Corigliano Calabro, Crotone, Vibo Valentia e Taureana di Palmi

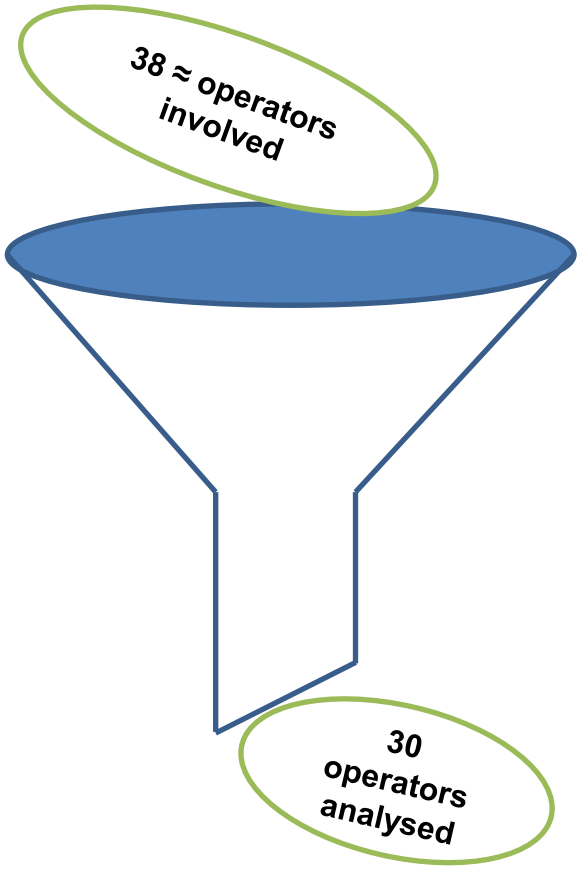
Reference year:
2022

GHG included:
CO_2, CH_4, N_20

Functions included:
- Mandatory (AdSP, Terminals, Road and maritime traffic)
- Optional (Ports for pleasure boating)
- Additional (Industrial and shipbuilding industry)

Calculation of GHG inventory: data collection

How many subjects:

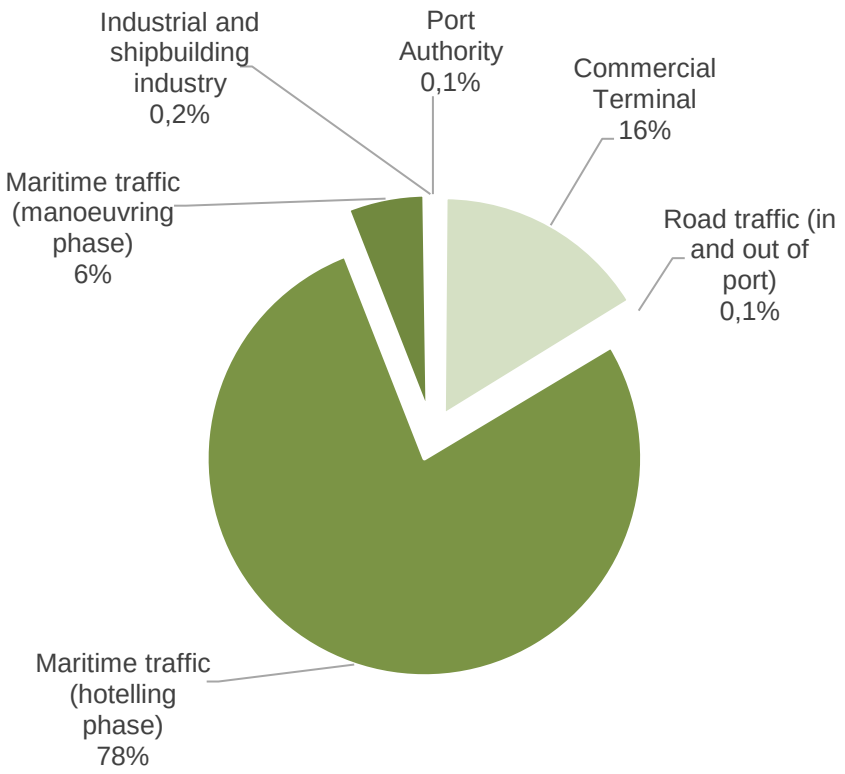


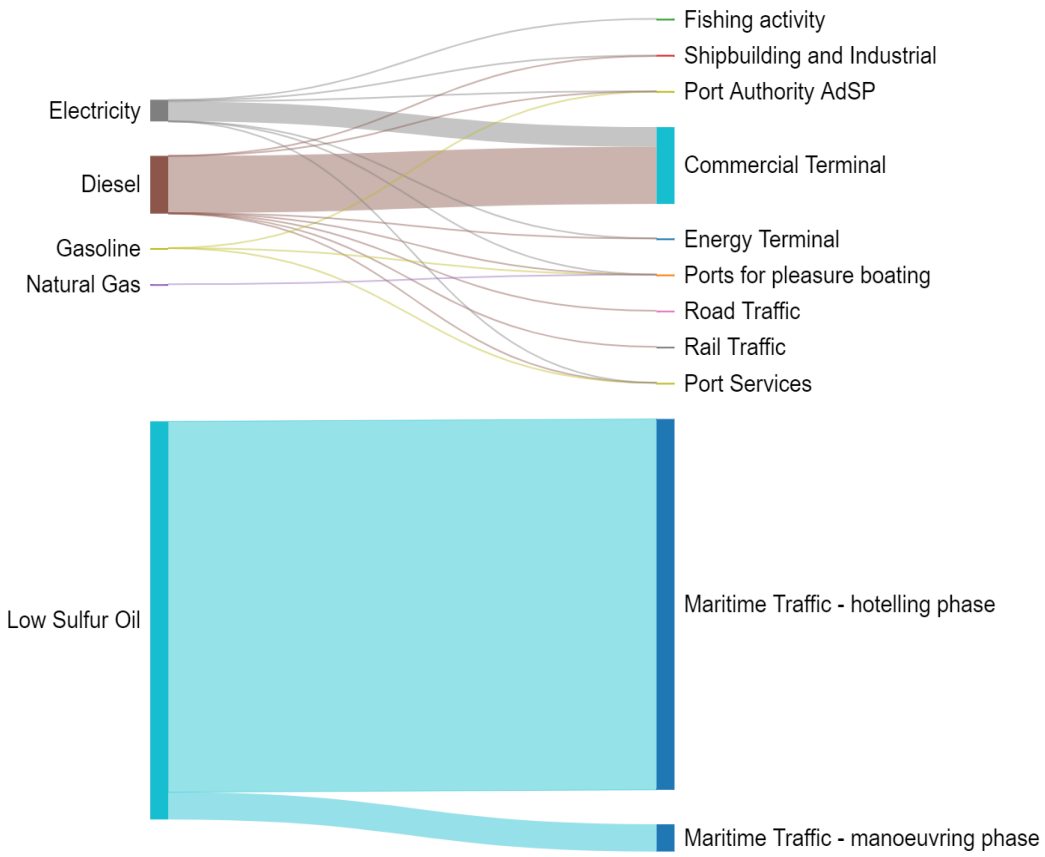
What subjects:

SUBJECT	PORT AREA
AUTOMAR SpA	Gioia Tauro
MED FRIGUS	Gioia Tauro
MCT - MedCenter Container Terminal	Gioia Tauro
Caronte&Tourist Logistics	Gioia Tauro
OMISUD Srl	Crotone
Ciliberto SpA	Crotone
Recycling Srl	Crotone
DE SANTIS BUNKERAGGIO	Crotone
AUSIMARE Srl	Crotone
CARMAR Srl	Crotone
Autonautica Tricoli SAS	Crotone
Lega Navale Crotone	Crotone
Yachting Kroton Club ASD	Crotone
Gruppo Ormeggiatori	Crotone
Piloti del Porto	Crotone
NAUTICA SAS FIORENZA	Crotone
Poseidon Srl	Crotone
PORT OPERATION HOLDING	Crotone

SUBJECT	PORT AREA
VREMAR	Crotone
MARIFARE	Crotone
CALABRIA DI NAVIGAZIONE SRL	Vibo Valentia
LA CARENA SRL	Vibo Valentia
PREVARIN SRL	Vibo Valentia
Azzurra SRL	Vibo Valentia
Stella del Sud	Vibo Valentia
Comerci Navigazione srl	Vibo Valentia
Savadori Navigazione	Vibo Valentia
ENI SpA	Vibo Valentia
Meridionale Petroli Srl	Vibo Valentia
Roberto Pisani srl	Vibo Valentia
MARPESCA GROUP SRL	Vibo Valentia
Ditta Colloca	Vibo Valentia
CHARTER LINE S.a.S.	Taureana di Palmi
ASSOCIAZIONE NAUTICA ALBATROS	Taureana di Palmi
ASSOCIAZIONE SPORTIVA DILETTANTISTICA "MAREA"	Taureana di Palmi
ASSOCIAZIONE PESCATORI DELLA TONNARA	Taureana di Palmi
MARESUD SRL	Corigliano Calabro

Evaluation of energy consumption – Summary of the Port System MTMI





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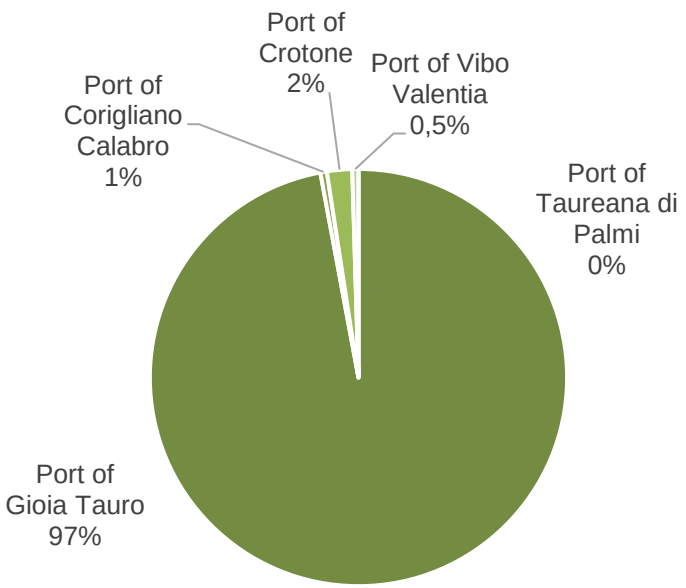

Port area	Scope 1	Scope 2	Total	
	[MWh]			%
Port of Gioia Tauro	762.251	36.481	**798.732**	**97%**
Port of Corigliano Calabro	3.900	216	**4.116**	**1%**
Port of Crotone	15.917	128	**16.045**	**2%**
Port of Vibo Valentia	3.417	503	**3.920**	**0,5%**
Port of Taureana di Palmi*	-	10	**10**	**0%**
Total	**785.485**	**37.338**	**822.823**	**100%**

** The energy consumption of the Port of Taureana di Palmi is totally related to the Scope 2, concerning the electricity, and it is totally related to the Port Authority utilities.*

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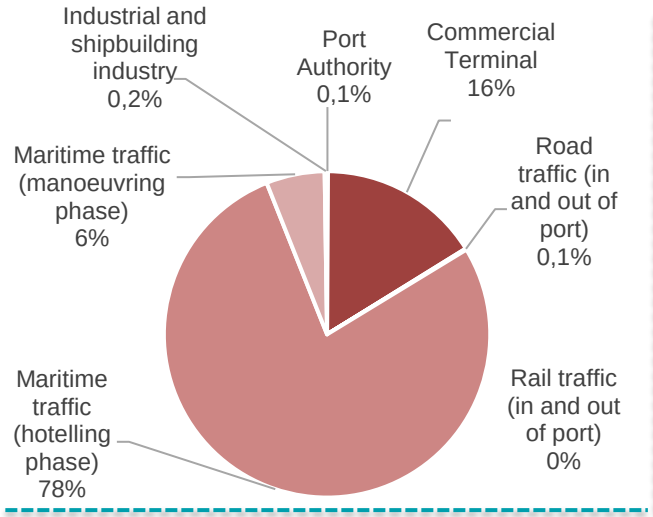
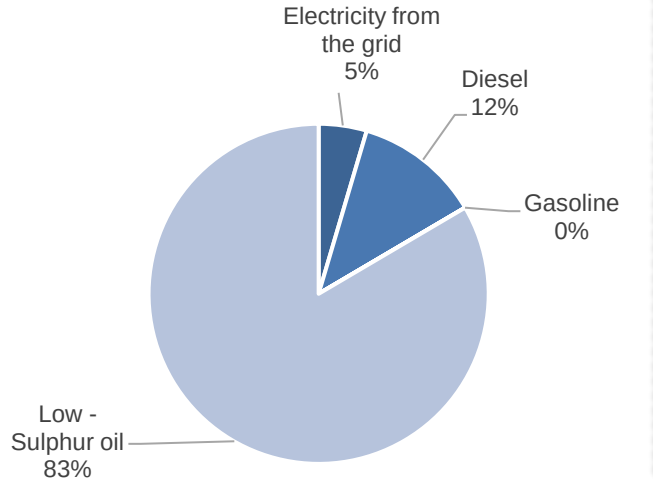
Evaluation of energy consumption – *Port of Gioia Tauro*





Type of activity	Electricity from the grid	Diesel	Gasoline	Low - Sulphur oil	Total	
	[MWh]					[%]
Port Authority	677	22	37	-	**736**	**0,1%**
Commercial Terminal	33.927	94.562	-	-	**128.489**	**16,%**
Road traffic (in and out of port)	-	686	-	-	**686**	**0,1%**
Rail traffic (in and out of port)	-	289	-	-	**289**	**0%**
Maritime traffic (hotelling phase)	-	-	-	620.304	**620.304**	**78%**
Maritime traffic (manoeuvring phase)	-	-	-	46.351	**46.351**	**6%**
SUB-TOTAL	**34.604**	**95.559**	**37**	**666.655**	**796.855**	**99,8%**
Industrial and shipbuilding industry	1.877	-	-	-	**1.877**	**0,2%**
TOTAL	**36.481**	**95.559**	**37**	**666.655**	**798.732**	**100%**

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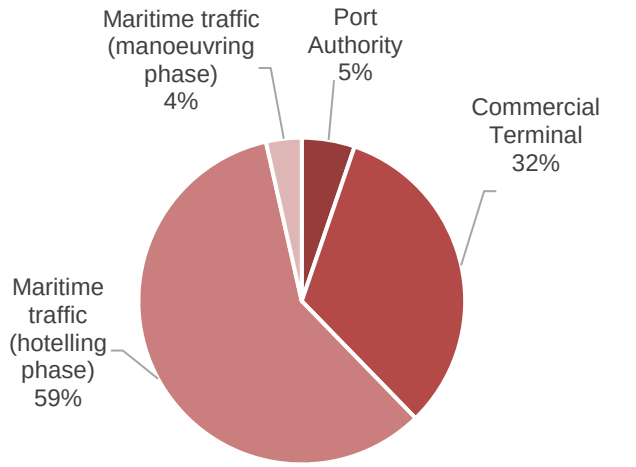
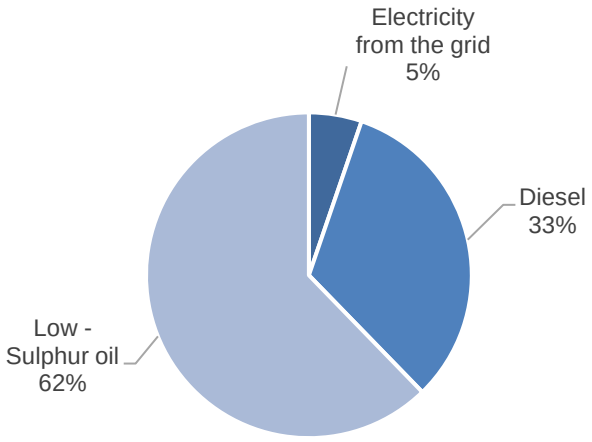
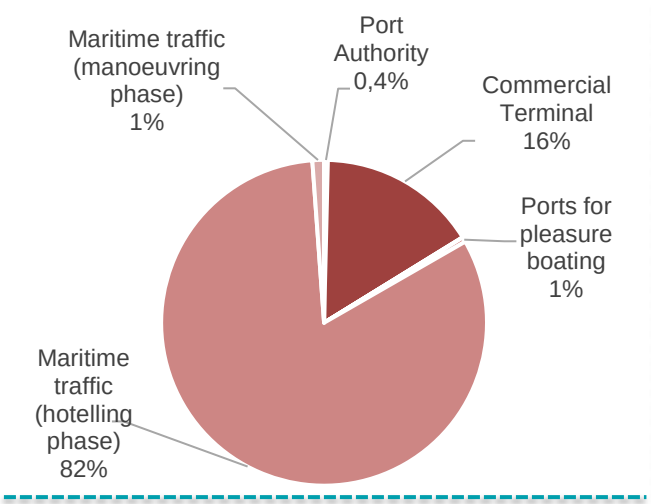
Evaluation of energy consumption – *Port of Corigliano Calabro*

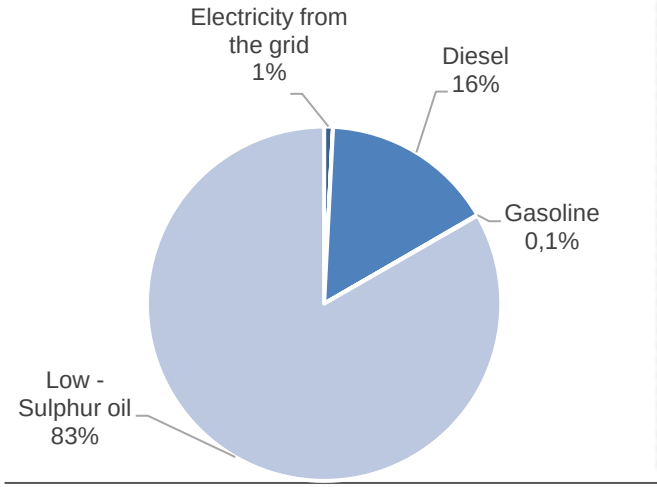




Activity Type	Electricity from the grid	Diesel	Low-Sulphur oil	Total	
	[MWh]				[%]
Port Authority	216	-	-	**216**	**5%**
Commercial Terminal	-	1.337	-	**1.337**	**32%**
Maritime traffic (hotelling phase)	-	-	2.418	**2.418**	**59%**
Maritime traffic (manoeuvring phase)	-	-	145	**145**	**4%**
TOTAL	**216**	**1.337**	**2.563**	**4.116**	**100%**

Evaluation of energy consumption – *Port of Crotone*





Activity Type	Electricity from the grid	Natural gas	Diesel	Gasoline	Low - Sulphur oil	Total	
	[MWh]						[%]
Port Authority	60	-	-	-	-	**60**	**0,4%**
Commercial Terminal	5	-	2.534	-	-	**2.539**	**16%**
Port services	1	-	6	-	-	**7**	**0%**
Ports for pleasure boating	61	2	-	10	-	**73**	**0,5%**
Maritime traffic (hotelling phase)	-	-	-	-	13.181	**13.181**	**82%**
Maritime traffic (manoeuvring phase)	-	-	-	-	184	**184**	**1%**
SUB-TOTAL	**127**	**2**	**2.540**	**10**	**13.365**	**16.044**	**100%**
Industrial and shipbuilding industry	1	-	-	-	-	**1**	**0%**
TOTAL	**128**	**2**	**2.540**	**10**	**13.365**	**16.045**	**100%**

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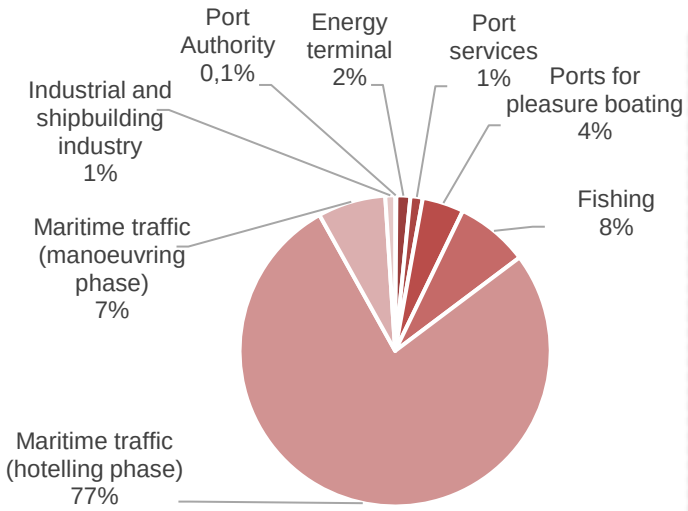
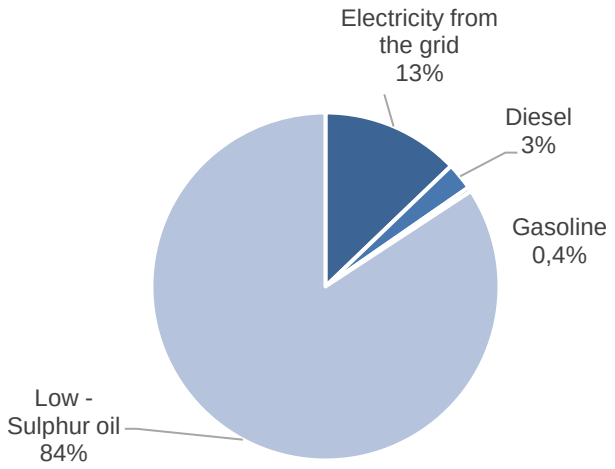
Evaluation of energy consumption – *Port of Vibo Valentia*





Activity Type	Electricity from the grid	Diesel	Gasoline	Low-Sulphur oil	Total	
	[MWh]					[%]
Port Authority	5	-	-		**5**	**0,1%**
Energy Terminal	52	5	-		**57**	**1%**
Port services	1	42	7		**50**	**1%**
Ports for pleasure boating	141	19	9		**169**	**4%**
Fishing	297	-	-		**297**	**8%**
Maritime traffic (hotelling phase)	-	-	-	3.025	**3.025**	**77%**
Maritime traffic (manoeuvring phase)	-	-	-	277	**277**	**7%**
SUB-TOTAL	**496**	**66**	**16**	**3.302**	**3.880**	**99%**
Industrial and shipbuilding industry	7	33	-	-	**40**	**1%**
TOTAL	**503**	**99**	**16**	**3.302**	**3.920**	**100%**

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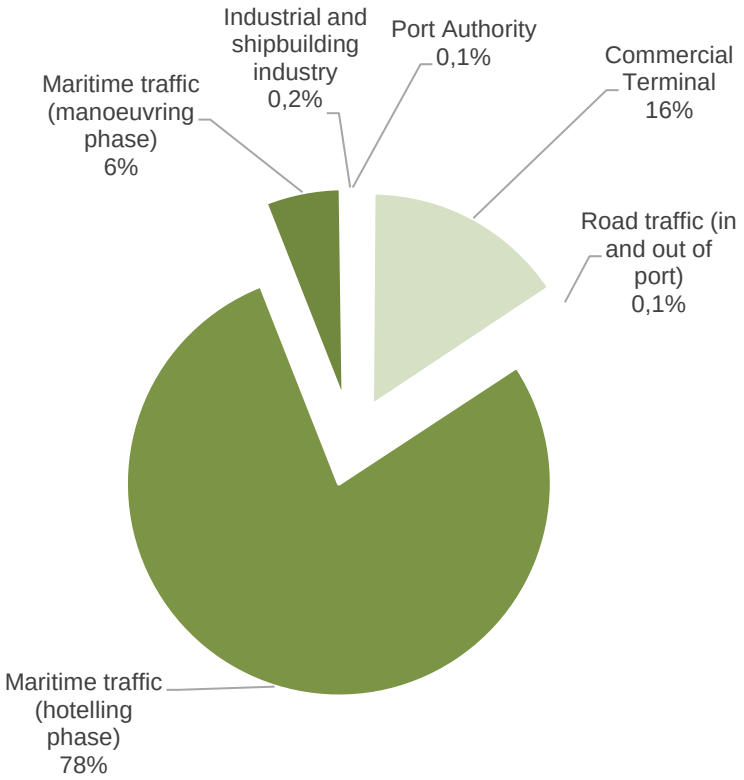
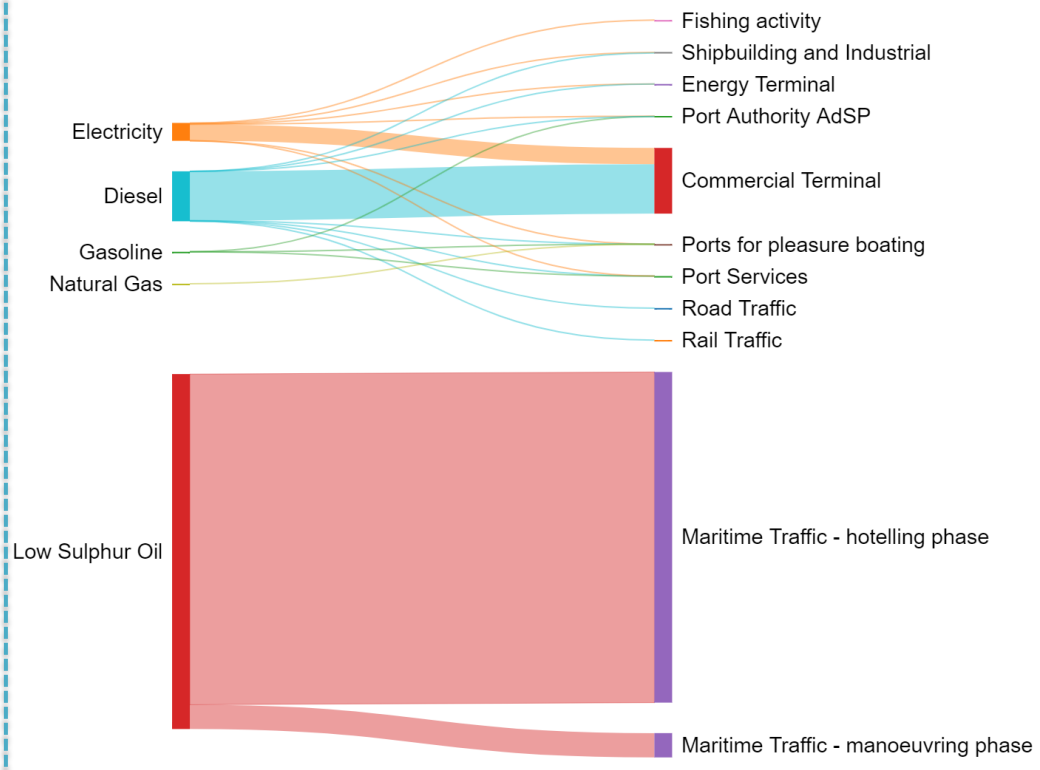
Evaluation of CO_{2eq} emissions – Summary of MTMI Port System





Evaluation of CO_{2eq} emissions – Summary of MTMI Port System

Maritime traffic in hotelling phase

	CO_{2eq} EMISSIONS BY TYPE OF SHIP AND BY PORT AREA				TOTAL	
	Gioia Tauro	Corigliano Calabro	Crotone	Vibo Valentia		
Type of ship	[tCO_{2eq}]					%
CO: Container	156.104				**156.104**	**88,0%**
LB: Liquid Bulk	1.027		723	575	**2.326**	**1,3%**
SB: Solid Bulk	1.660	60			**1.720**	**1,0%**
GC: General Cargo	254	612	408	18	**1.291**	**0,7%**
PA: Passenger			149	33	**183**	**0,1%**
PC: Ro-Ro Passenger	13.186		1.103		**14.289**	**8,1%**
TU: Tugs			66	213	**279**	**0,2%**
OT: Other			1.210		**1.210**	**0,7%**
Total	**172.231**	**671**	**3.660**	**840**	**177.402**	**100%**
%	**97,1%**	**0,4%**	**2,1%**	**0,5%**	**100%**	

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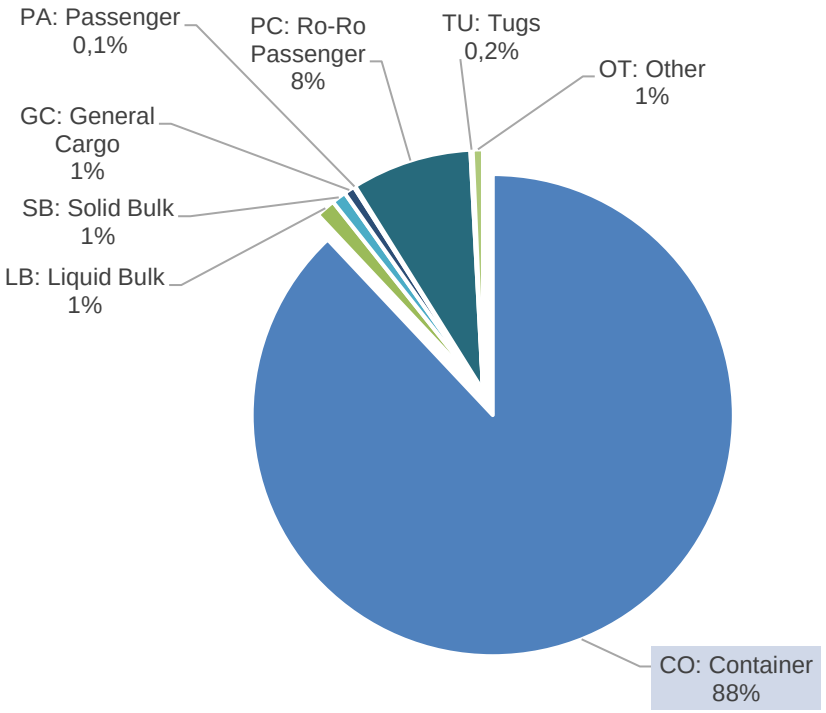
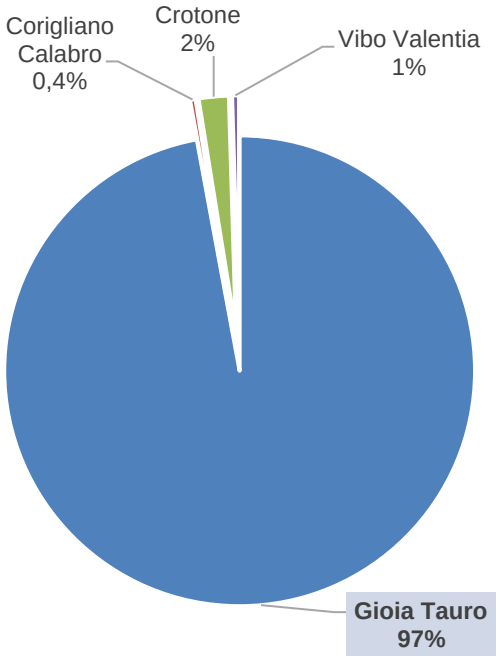
Evaluation of CO_{2eq} emissions – Summary of MTMI Port System

Maritime traffic in hotelling phase

Allocation of CO_{2eq} emissions of maritime traffic in hotelling phase by type of ship



Allocation of CO_{2eq} emissions of maritime traffic in hotelling phase by port area



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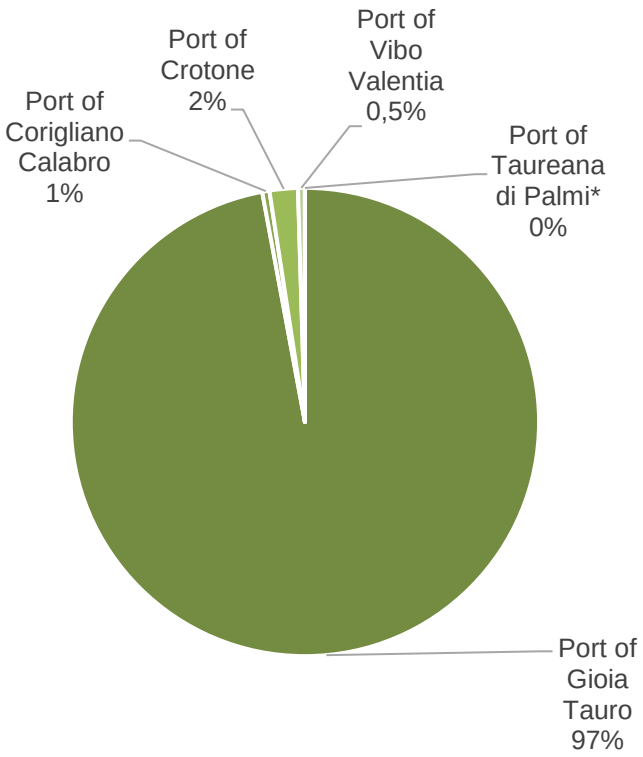
Evaluation of CO_{2eq} emissions – Summary of MTMI Port System



Port Area	Scope 1 – Direct emissions	Scope 2 – Indirect emissions	Total	
	[tCO_{2eq}]			%
Port of Gioia Tauro	210.844	9.387	**220.231**	**97%**
Port of Corigliano Calabro	1.071	55	**1.126**	**0,5%**
Port of Crotone	4.396	32	**4.428**	**2%**
Port of Vibo Valentia	947	129	**1.076**	**0,5%**
Port of Taureana di Palmi*	-	2	**2**	**0%**
Total	**217.258**	**9.605**	**226.864**	**100%**

**CO_{2eq} emissions of the Port of Taureana di Palmi are totally related to the Scope 2, concerning the electricity, and regard the Port Authority utilities.*

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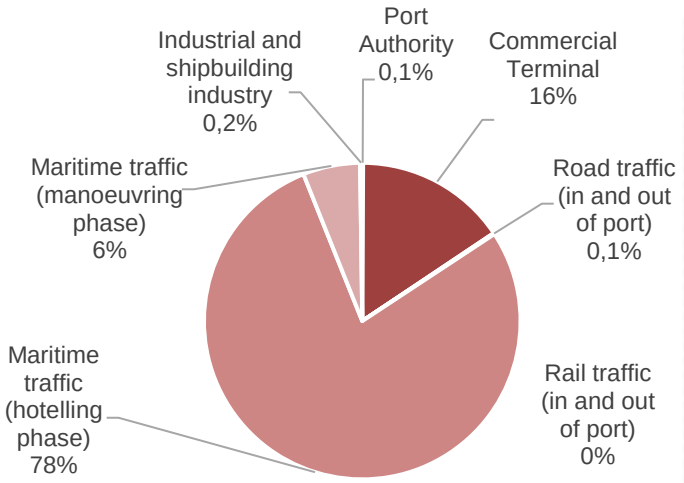
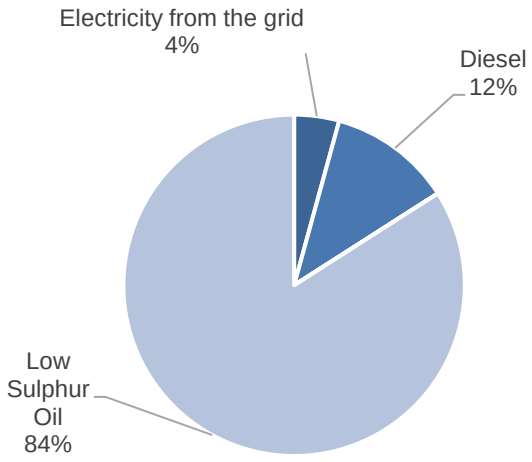
Evaluation of CO_{2eq} emissions – *Port of Gioia Tauro*





Activity Type	Electricity from the grid	Diesel	Gasoline	Low Sulphur Oil	Total	
	[tCO_{2eq}]					[%]
Port Authority	174	6	10	-	**190**	**0,1%**
Commercial Terminal	8.730	25.466	-	-	**34.196**	**16%**
Road traffic (in and out of port)	-	184	-	-	**184**	**0,1%**
Rail traffic (in and out of port)	-	77	-	-	**77**	**0%**
Maritime traffic (hotelling phase)	-	-	-	172.231	**172.231**	**78%**
Maritime traffic (manoeuvring phase)	-	-	-	12.870	**12.870**	**6%**
SUB-TOTAL	**8.904**	**25.733**	**10**	**185.101**	**219.748**	**100%**
Industrial and shipbuilding industry	483	-	-	-	**483**	**0,2%**
TOTAL	**9.387**	**25.733**	**10**	**185.101**	**220.231**	**100%**

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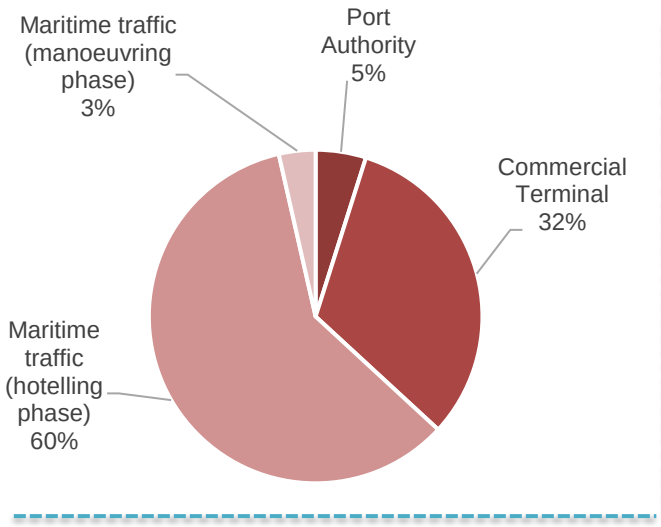
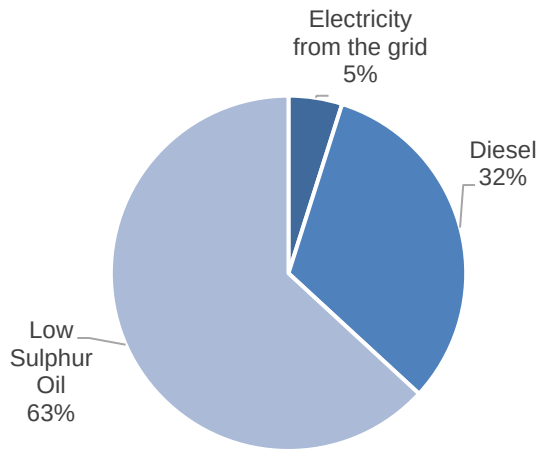
Evaluation of CO_{2eq} emissions – *Port of Corigliano Calabro*





Activity Type	Electricity from the grid	Diesel	Low Sulphur Oil	Total	
	[tCO_{2eq}]				[%]
Port Authority	55	-	-	**55**	**5%**
Commercial Terminal	-	360	-	**360**	**32%**
Maritime traffic (hotelling phase)	-	-	671	**671**	**60%**
Maritime traffic (manoeuvring phase)	-	-	40	**40**	**4%**
TOTAL	**55**	**360**	**711**	**1.126**	**100%**

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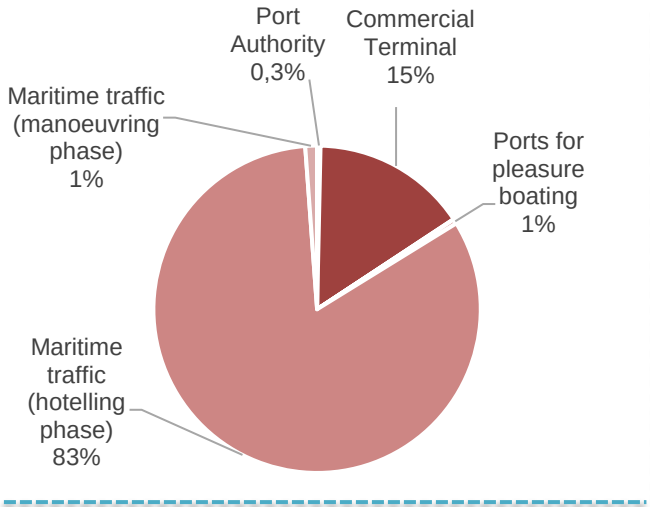
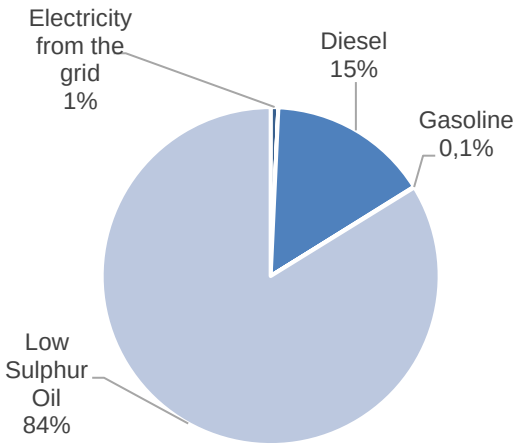
Evaluation of CO_{2eq} emissions – *Port of Crotone*





Activity Type	Electricity from the grid	Natural Gas	Diesel	Gasoline	Low Sulphur Oil	Total	
	[tCO_{2eq}]						[%]
Port Authority	15	-	-	-	-	**15**	**0,3%**
Commercial Terminal	1	-	680	-	-	**681**	**15%**
Port Services	0,2	-	2	-	-	**2**	**0%**
Ports for pleasure boating	16	0,4	-	3	-	**19**	**0%**
Maritime traffic (hotelling phase)	-	-	-	-	3.660	**3.660**	**83%**
Maritime traffic (manoeuvring phase)	-	-	-	-	51	**51**	**1%**
SUB-TOTAL	**32**	**0,4**	**682**	**3**	**3.711**	**4.429**	**100%**
Industrial and shipbuilding industry	0,3	-	-	-	-	**0,3**	**0%**
TOTAL	**33**	**0,4**	**682**	**3**	**3.711**	**4.429**	**100%**

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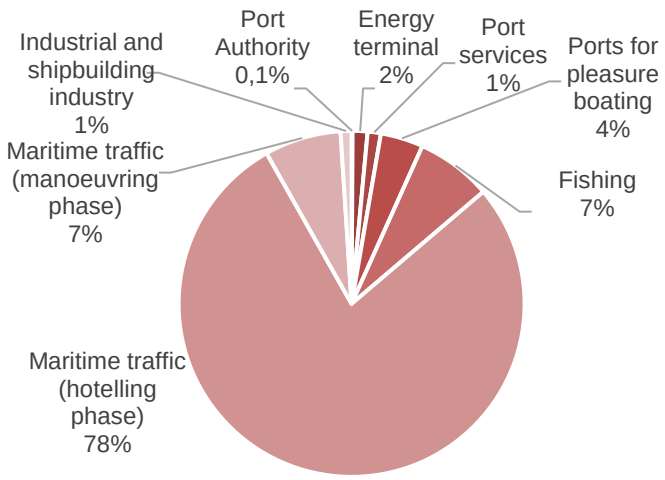
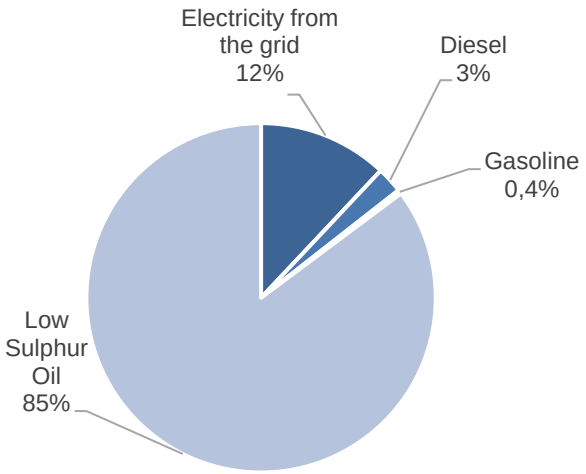
Evaluation of CO_{2eq} emissions – *Port of Vibo Valentia*





Activity Type	Electricity from the grid	Diesel	Gasoline	Low Sulphur Oil	Total	
	[tCO_{2eq}]					[%]
Port Authority	1	-	-	-	**1**	**0%**
Energy terminal	14	1	-	-	**15**	**1%**
Port services	0,3	11	2	-	**13**	**1%**
Ports for pleasure boating	36	5	2	-	**43**	**4%**
Fishing	76	-	-	-	**76**	**7%**
Maritime traffic (hotelling phase)	-	-	-	840	**840**	**78%**
Maritime traffic (manoeuvring phase)	-	-	-	77	**77**	**7%**
SUB-TOTAL	**127**	**17**	**4**	**917**	**1.065**	**99%**
Industrial and shipbuilding industry	2	9	-	-	**11**	**1%**
TOTAL	**129**	**26**	**4**	**917**	**1.076**	**100%**

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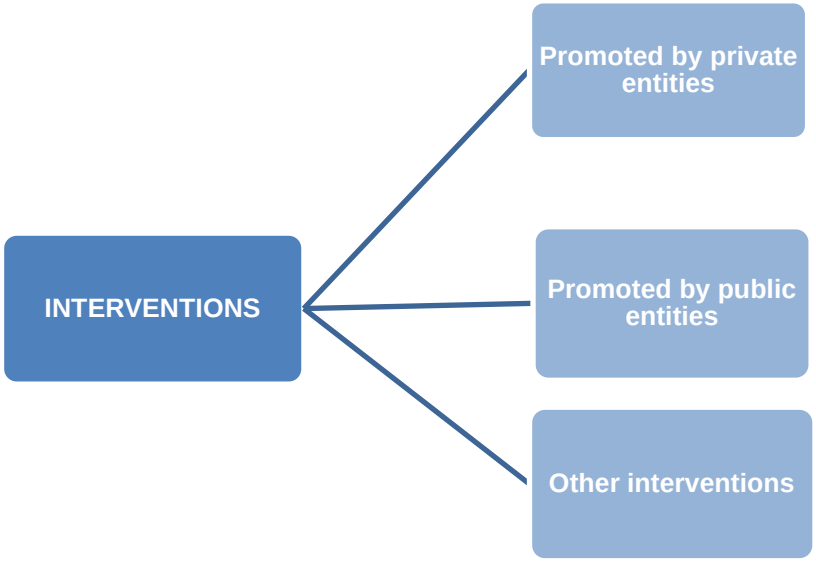
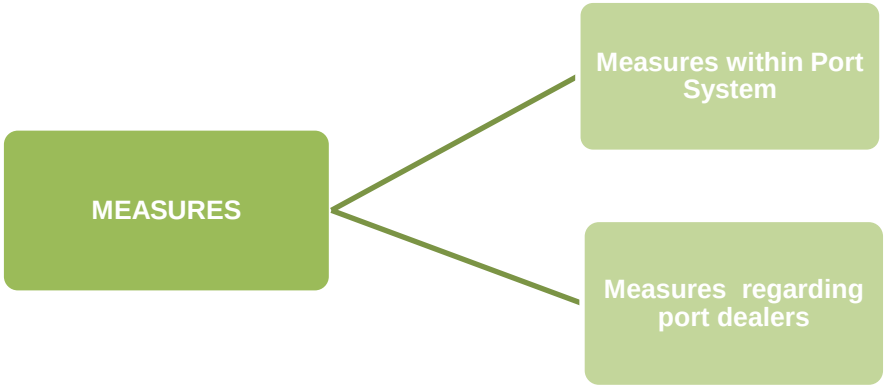
Definition of measures and interventions





The **interventions** include works, plants, structures, works, as a result of investments made with the aim of improving energy efficiency and producing energy from renewable sources.

The **measures**, which aim to reduce CO_{2eq} emissions through the introduction of rules, priorities, facilitations, incentive mechanisms etc. (calls and contracts with dealers etc.).

Interventions promoted by private entities

TYPE	PROPOSED INTERVENTIONS	CO_{2eq} EMISSIONS AVOIDED [t]
Interventions promoted by private entities	***Port of Gioia Tauro***	
	LED transformation of the forecourt lighting system – *Automar S.p.A*	**299**
	Installation of a 100 kW PV trackside system and storage system – *Automar S.p.A*	**39**
	Installation of a 650 kW photovoltaic system – *Med Frigus*	**244**
	Port of Crotone	
	Installation of a 6 kWp photovoltaic system - *Yachting Kroton Club*	**2**

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Interventions promoted by public entities

Port of Gioia Tauro

TYPE	PROPOSED INTERVENTIONS	CO_{2eq} EMISSIONS AVOIDED [t]
Interventions promoted by public or public-private entities	Maintenance of the public lighting system in the Interporto area	**10**
	Upgrading and modernization of the rear port - Preparation of lighting and video surveillance	**26**
	Completion of urbanization works - Construction of a photovoltaic park	**453**
	Realization of photovoltaic shelters at the Port Authority site	**17**
	Cold ironing of Ro-Ro quay, segment D2, of Commercial Port	**2.800**
	Cold ironing of Levante Dock	**72.300**

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Interventions promoted by public entities

Port of Corigliano Calabro

TYPE	PROPOSED INTERVENTIONS	CO_{2eq} EMISSIONS AVOIDED [t]
Interventions promoted by public or public-private entities	Maintenance of the lighting system and lighthouse towers	**147**
	Cold ironing of cruise dock section	**1.000**

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Interventions promoted by public entities

Port of Crotone

TYPE	PROPOSED INTERVENTIONS	CO_{2eq} EMISSIONS AVOIDED [t]
Interventions promoted by public or public-private entities	Restoration of lighting system of piers under waves and piers	**124**
	Cold ironing of sections of Riva quay and dock piers	**1.400**

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Interventions promoted by public entities

Port of Vibo Valentia

TYPE	PROPOSED INTERVENTIONS	CO_{2eq} EMISSIONS AVOIDED [t]
Interventions promoted by public or public-private entities	Upgrading of the lighting system	**10**
	Cold ironing of Bengasi Dock	**1.400**

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Other interventions

TYPE	PROPOSED INTERVENTIONS	PORT AREA
Other interventions *interventions planned by the Port Authority to improve the general efficiency of the ports of the Port System, but that do not fall within the categories of energy-environmental interventions defined by the DEASP Guidelines*	Urbanization area ex ENEL	Port of Gioia Tauro
	Realization of the Citadel of Inspections and the multifunctional structure of PCF border control integrated with PED/PDI	Port of Gioia Tauro
	Realization of the Port Community System	Port of Gioia Tauro, Crotone and Corigliano Calabro
	Upgrading of electricity infrastructure	Port of Gioia Tauro
	Realization of anemological analysis by installation of test pole for wind direction and speed measurements	Port of Gioia Tauro
	Completion of the quays of Riva	Port of Taureana di Palmi
	Realization on the reserved port system dock to the fishing boats of columns services for the distribution water and electric	Port of Corigliano Calabro
	Improvement of the electric system of the company Medcenter Container Terminal (MCT)	Port of Gioia Tauro

Measures

TYPE	MEASURE	DESCRIPTION	CO_{2eq} EMISSIONS AVOIDED [t]
Measures within the Port System	Promotion and establishment of Renewable Energy Communities (REC) in port	• Organisation of training workshops about RECs • Starting the studies of technical-economic feasibility of REC in the Port System • Activating technical and legal support services aimed at operators or dealers who intend to participate/ constitute a REC	Not quantified
	Realization of a monitoring system for the energetic-environmental performances of the Ports of the Port System	• Development of monitoring system to strengthen direct and indirect measures about air quality and energy consumption in the ports	Not quantified
Measures addressed to port dealers	Implementation of renewable energy production plants (RES)	• Introduction of award criteria in the context of new tenders and state-owned regulations	**3.700**
	Implementation of energy efficiency measures for buildings and processes		
	Electricity supply with Guarantee of Origin	• Binding or rewarding the Concessionaire to the use of electricity with Guarantee of Origin, modifying the rules for the granting of concessions	**9.000**

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CO_{2eq} emissions reduction foreseen at 2030

Implementation of all energy-environmental measures

-39% 89.171 tCO_{2eq}

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Cost-Benefits analysis – Summary of results

INTERVENTIONS WITH COST-EFFECTIVENESS ANALYSIS			
PRIORITY	**INTERVENTION**	**INDICATOR [tCO_{2eq}/€]**	**PORT AREA**
1	Installation of a 6 kWp photovoltaic system - Yachting Kroton Club	0,01395	Port of Crotone
2	Restoration of lighting systems of piers under waves and piers	0,01169	Port of Crotone
3	Completion of urbanization works - Construction of a photovoltaic park	0,01094	Port of Gioia Tauro
4	Realization of photovoltaic shelters at the Port Authority site	0,00941	Port of Gioia Tauro
5	Maintenance of the lighting system and lighthouse towers	0,00895	Port of Corigliano Calabro
6	Maintenance of the lighting system in the Interporto area	0,00390	Port of Gioia Tauro
7	Upgrading of the lighting system	0,00159	Port of Vibo Valentia
8	Modernization of the port	0,00115	Port of Gioia Tauro

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Cost-Benefit Analysis – Summary of results

INTERVENTIIONS WITH COST-BENEFITS ANALYSIS			
PRIORITY	**INTERVENTION**	**INDICATOR [-]**	**PORT AREA**
1	Cold ironing of Levante quay – Lot 1	**3,23**	Port of Gioia Tauro
2	Cold ironing of Ro-Ro quay, segment D2, of Commercial Port	**3,18**	Port of Gioia Tauro
3	Cold ironing of the cruise dock section	**1,09**	Port of Corigliano Calabro
4	Cold ironing of Bengasi quay	**1,07**	Port of Vibo Valentia
5	Cold ironing of sections of Riva quay and dock piers	**1,06**	Port of Crotone

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Summary of the impact of the interventions on the energy inventory of the Port System

PORT SYSTEM	2022 ENERGY CONSUMPTION	ENERGY SAVED BY INTERVENTIONS	ENERGY SAVED BY MEASURES	CONSUMPTION REDUCTION
	[MWh]			[%]
Port of Gioia Tauro	798.732	252.220	**49.727**	**37%**
Port of Corigliano Calabro	4.116	572		
Port of Crotone	16.045	489		
Port of Vibo Valentia	3.920	38		
Port of Taureana di Palmi	10	-		
Total	**822.823**	**253.319**	**49.727**	**37%**

**The interventions of cold ironing are characterized by a replacement of the energy carrier and has not been associated with energy savings, but only in terms of GHG emissions.*

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Summary of the impact of the interventions on the emissions inventory of the Port System

PORT SYSTEM	2022 EMISSIONS	EMISSIONS AVOIDED BY INTERVENTIONS	EMISSIONS AVOIDED BY MEASURES	EMISSIONS REDUCTION
	[tCO_{2eq}]			[%]
Port of di GioiaTauro	220.231	76.188	**12.700**	**39%**
Port of Corigliano Calabro	1.126	147		
Port of Crotone	4.429	126		
Port of Vibo Valentia	1.076	10		
Port of Taureana di Palmi	2	-		
Total	**226.864**	**76.471**	**12.700**	**39%**

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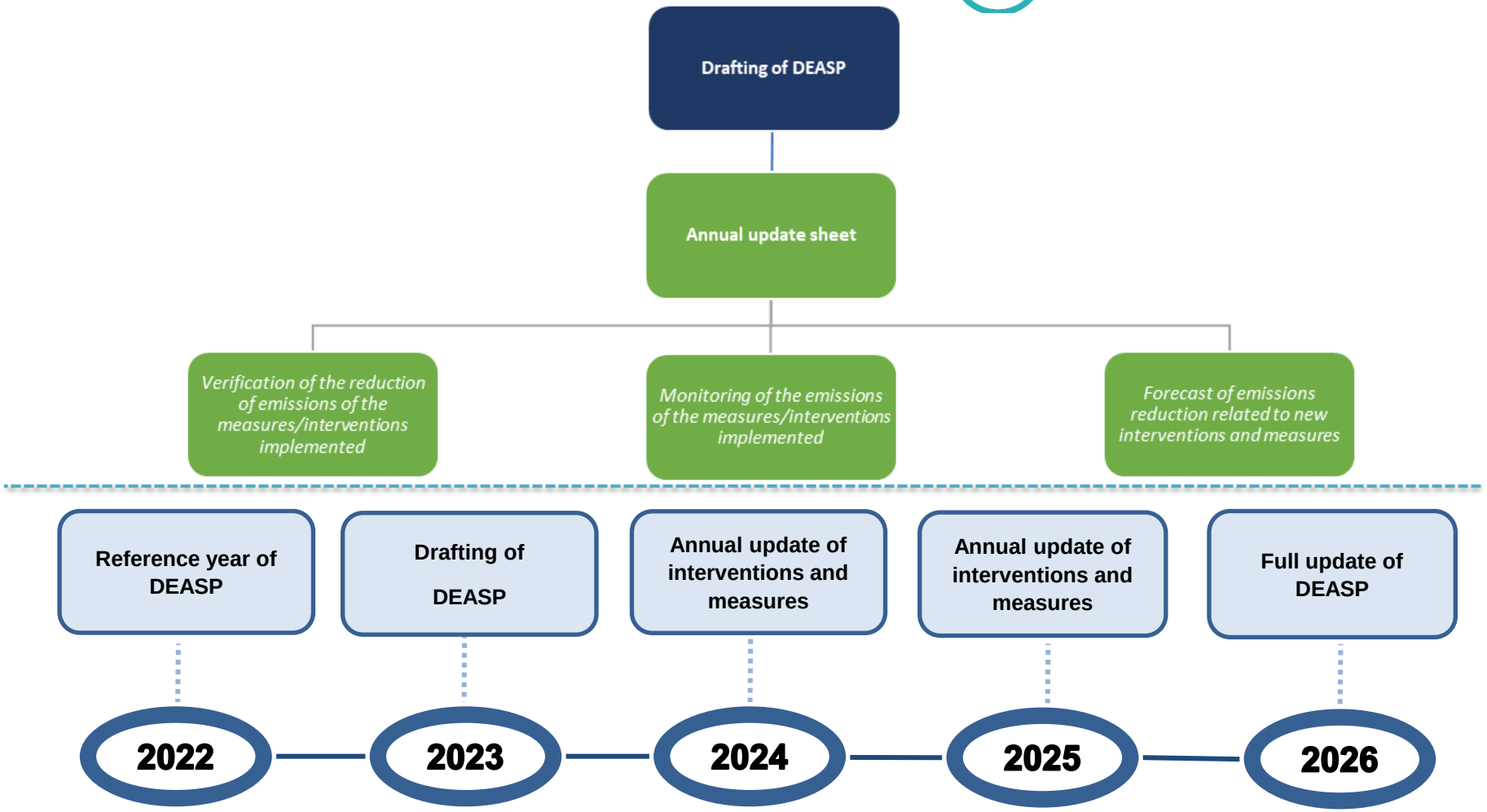
Update and monitoring of DEASP



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