

SUPAIR
SUSTAINABLE PORTS
IN THE ADRIATIC-IONIAN REGION

Action Plan for a Sustainable and Low-carbon Port of Thessaloniki

AUTHOR/INSTITUTION: Thessaloniki Port Authority

WPT1

Last update 30/11/2019

Work package: WPT1

Deliverable title: DT1.9.1 Action Plan for a Sustainable and Low-carbon Port of Thessaloniki

Expected date: November 2019

Description: The current deliverable is the Action Plan for a Sustainable and Low-carbon the Port of Thessaloniki developed in the context of SUPAIR project. The methodology used for the development of the deliverable has been described in DT1.2.1 Guidelines for Sustainable and Low-carbon Ports.

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Dissemination level: PU - Public

Status: Final

Version: 3

Date: 30/11/2019

Document control

Revision History

<i>Version</i>	<i>Date</i>	<i>Author</i>	<i>Organisation</i>	<i>Comment</i>
1.0	26/11/2018	Panagiotis Theodosiou, Eva Vafaki, Ioannis Ioannidis, Lazaros Ladopoulos	Thessaloniki Port Authority	Initial draft
2.0	11/11/2019	Panagiotis Theodosiou, Eva Vafaki, Ioannis Ioannidis, Lazaros Ladopoulos	Thessaloniki Port Authority	Draft
3.0	30/11/2019	Maria Boile, Lefteris Sdoukopoulos, Alkiviadis Tromaras	CERTH	Final

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1 Definition of “sustainable port as a key element of wider low carbon strategies”

Over the past quarter of a century, the challenges ports are facing have changed considerably. The traditional definition of a port as *“the area, where traffic changes between land and sea modes of transport”* has been modified to demonstrate the indispensable role that ports play in the logistic and transport chain. Ports are now *“a mixture of industry and services that serve specific production and distribution processes”*. In addition, the situation becomes more complex since ports are coming under pressure from the global market forces of innovation and containerization, and the local political forces for redevelopment.

These new characteristics have made ports, sensitive to environmental protection and sustainable development, with the need to adopt the sustainable responsibilities in a practicable and cost-effective manner. In this framework, port sustainable development can be defined as the situation in which the port is able to meet its own needs without endangering its own future.

However, it should be highlighted, that the concept of sustainability is generally accepted today to cover much more than strictly environmental issues. The Triple Bottom Line (TBL) encompassing people, planet, profit is a concept that extends the frame of sustainability to include social and economic aspects. The TBL refocuses the measurement of corporate performance from the perspective of a shareholder (predominantly financially driven) to that of a stakeholder (anyone affected by the actions of a firm) and coordinates three interests: ‘people, planet and profit’. When there is a balance between these three ‘P’s, there is sustainability.

Regarding specifically the issue of energy and climate change mitigation, while normal challenges remain to provide capacity and interconnectivity, all ports share an overarching objective to decarbonize. The most recent special report from the Intergovernmental Panel on Climate Change analyses the impact of global warming of 1.5 °C above pre-industrial levels, which brings more urgency to this challenge.

In national and international transport supply chains, ports are the nodes where shipping meets land transport. Ports are also the location for carbon-based industries including petrochemical complexes and power generation plants. The challenge to decarbonise transcends to all port operators and, for their part, ports could commit to achieving this essential objective. Port environmental efficiency is essential to minimise wasted consumption of hydrocarbons and electricity whether by ports themselves or by terminal operators or by ships. However, the challenge of climate change demands huge reductions if not the elimination of carbon emissions in the supply chain.

Based on the above, Thessaloniki Port Authority S.A. accepts the definition given to the “sustainable port” by “SUPAIR” project which is as follows: *“A sustainable and low-carbon port is one that in close consultation with its users and stakeholders, commits into, proactively plans and responsibly and continuously works towards ensuring economic prosperity and long-term improvement of the quality of life in the port area and the urban community it serves. Considering existing needs as well as the needs of future generations, a sustainable and low-carbon port puts forward and deploys different measures, actions and strategies, following an integrated approach, for efficiently protecting and managing natural and human resources, ensuring environmental protection and climate change mitigation and exploiting and widening the use of environmentally-friendly technologies and renewable energy sources”*.

2 Understanding current port operations and management models

2.1 General information

For 2300 years, since its foundation in 315/6 BC and up until today, the port of Thessaloniki constitutes the most important port in the geographic area of Macedonia and one of the most important ports in Southeast Europe. Due to its advantageous geographical location and its excellent road links and train connections, it is the largest transit-trade port in the country and it services the needs of approximately 15 million inhabitants of its international mainland. It is located on the inner part of the Bay of Thermaikos, on the northern section of the Eastern Mediterranean Sea, to the west of the centre of the city of Thessaloniki. Approach of the ships is accomplished through a natural channel of substantial depth, not needing thus any further deepening.



Figure 1: The location of the port of Thessaloniki in Greece and Balkan Peninsula.

The port occupies a total space of 1.5 million square meters and it spreads across a length of 3.5km. The port installations include 6 piers spreading on a 6200 meter-long quay and a sea depth down to 12 meters, with open and indoors storage areas spreading on a total of 600,000 square meters, suitable for servicing all types of cargo as well as passenger traffic. The port also has installations suitable for liquid fuel storage and it is located in proximity to the international, natural-gas pipeline. The terrestrial port zone of ThPA S.A. covers an area of roughly 155ha, and extends along roughly 3500 m. The quay length is 6200m with a net depth up to 12 meters, and includes 6 piers, administration and technical support buildings, warehouses, depots, special equipment and other facilities.

It is located at a distance of 1km from the Passenger Railway Station and 16km from the city's International Airport, and is surrounded by four other countries: Albania, North Macedonia, Bulgaria and Turkey. Its position is of great geographical importance because it serves as a natural gateway of the Balkans to the Mediterranean Sea since antiquity and is also close to several capitals: 504km from Athens (Greece), 328km

from Tirana (Albania), 219km from Skopje (North Macedonia), 280km from Sofia (Bulgaria), 609km from Belgrade (Serbia), 608km from Bucharest (Romania) and 630km from Constantinople (Turkey).



Figure 2: Map of the Port of Thessaloniki (Current situation).

Due to the temperate climate, the well protected from weather conditions approach, the existence of a 1000m-long wave breaker which protects the port from the southern winds, the almost null tide, (maximum height of 0.7m) and the port's secure installations, the loading and unloading of cargoes as well as the embarking/disembarking of passengers on ferry and cruise ships take place smoothly, throughout the whole year.

The Free Zone (Control Type I: fencing, customs' supervision and cargo inspection on the points of entrance – exit, inspection of persons and vehicles) is also part of the Port of Thessaloniki and it has been operating since 1995 in accordance with the European Community Customs Code.

The Port is linked to a dense, traffic network that is directly linked to the national and international road network, bypassing thus the city's west entrance. All the port's quays are being equipped with double/triple rail-lines and are linked to the national and international railroad network.

The port enjoys a privileged position being located at the crossroad of major land transportation networks, as follows: East to West, (Egnatia Motorway) and South to North (PATHE Motorway Patras-Athens-Thessaloniki-Evzoni or Idomeni) which continues further to the north, not only as an eastern corridor – Eastern Mediterranean, of the Central layer of the Trans-European Transport Networks (TEN-T Core Network Corridor Orient - East Med), but also as the Pan-European Corridor X. Last, it has been characterized as a Port of National Interest in the Country's Coast-guard System and one of the five Greek ports, which belong to the Core layer of Trans-European Transport Network.

ThPA applies strict safety standards and has fully complied with the requirements of the ISPS (International Ship and Port Facility Security Code) for the safety of its port installations. The Authority's personnel are trained in accordance with the Port Development Program of the International Labor Office (ILO) and constantly follows targeted education programs.

2.2 Ownership and Governance

The Societe Anonyme "Thessaloniki Port Authority" (THPA S.A.) was established in the year 1999 (Law 2688/99) with the aim to manage and exploit the port of Thessaloniki. On June 27 2001, concession of rights was granted by the Greek State to TPHA S.A. for a period of 40 years, with the exclusive right to use and exploit the sites, buildings and installations of the land, coastal zone of the Port of Thessaloniki, which are owned by the Greek State). In 2009, the concession period was extended for 10 more years.

On March 23, 2018, as part of the port's privatisation process launched by the Greek State, 67% of the Company's share capital was transferred to South Europe Gateway Thessaloniki (SEGT) Limited, a consortium consisting of the following companies: «Deutsche Invest Equity Partners GmbH», «Belterra Investments Ltd.» and «Terminal Link SAS». The consortium committed to a significant investment program dedicated to the completion of the Pier 6 Extension Plan, along with the deepening of its current draught and the upgrade of current equipment.

Following the port's privatisation, a new management team was appointed with the primary objective to strengthen safety, improve quality of service and customer satisfaction, enhance productivity and make the Port an agile organization able to cope within a rapidly changing business environment. The company's stock is listed in the Athens Stock Exchange since August 27th 2001, the date of its initial market listing.

ThPA SA's corporate governance is structured as a system of relationships between the company's Management, its Board of Directors, its Shareholders, and other interested parties. The main document that describes how the company is governed is the "Corporate Governance Code" which has the objective to: 1. adopt Corporate Governance best practices, 2. facilitate the creation of corporate governance policies and practices, 3. improve the briefing of private or institutional Investors, Greek or foreign, and 4. establish an accessible and comprehensible reference system that forms the foundation for the corporate governance statement. ThPA's Corporate Governance Code entered into force upon its authorization/adoption by the company's Board of Directors and any amendments to the Corporate Governance Code shall apply subsequent to the authorization/approval and decision of the Board of Directors.

Moreover, apart from the Corporate Governance Code, ThPA management has established a set of regulations and policies that enable the effective governance of the company. These are the Operational Regulation of the Board of Directors, the Audit Committee's Charter, the Conflict of Interest Policy, the Policy on the Protection of Confidential Information, the Code of Ethics, the Diversity Policy, the Environmental policy as well as the Policy for Occupational Health and Safety.

2.3 Personnel

The driving force for ThPA SA is its personnel, which is divided into the clerical personnel (Administrative, Technical, Auxiliary) and the longshoremen. In 2018 it employed 422 people (of whom 164 were regular staff, 121 longshoremen and 137 Technical Institute of Education (TEI) students, Hellenic Manpower Organization (HMO) apprentices and temporary staff), against 424 in 2017 (208 regular, 123 longshoremen and 93 interns and apprentices). Labor relations are regulated by the General Personnel Regulation, the National General Collective Agreement, or the Sectoral (Industry-wide) or similar-profession Contracts, while the remuneration of the employees are governed by the Operational Collective Agreement for regular staff and longshoremen. The company invests in the continuous training and briefing of its personnel by virtue of educational and training programmes and seminars on general issues, such as communication, management, economics, hygiene and safety.

2.4 Nature of activities

The purpose of the Company is to fulfil the obligations, conduct the activities and exercise the opportunities arising from the initial Concession Agreement between the Company and the Greek State of 27 June 2001 on the use and exploitation of certain areas and assets at the port of Thessaloniki as amended and are currently in force.

In order to fulfill its purpose, the Company may, but is not limited to:

- Make use of all the rights granted under the Concession Agreement and maintain, develop and operate the assets under concession as set out in the Concession Agreement.
- Provide services and facilities to ships, cargoes and passengers including shipboard mooring as well as cargo and passenger handling to and from the port.
- Provide other port related services such as security, freshwater, electricity, telephone and waste management.
- Install, organize and operate all port infrastructure.
- Engage in any activity related to the Port of Thessaloniki and any commercial activity related to the Port of Thessaloniki or reasonably incidental to it.
- Contract with third parties to provide port services of all kinds.
- Award work contracts.
- Engage in any additional activity that is advisable or routine for the proper conduct of its business and its operations in accordance with the Concession Agreement; and
- Take any other activity, transaction or action from those conducted by commercial companies in general.

Its business activities concern the provision of services:

- in containerized cargo,
- in conventional cargo (bulk, general, RO-RO),
- to cruise ships and cruise passengers
- to ships (anchoring, berthing and other services);
- in car park services.
- in the offering of spaces for commercial and other uses

2.5 Port sectors per activity

With regard to the different operations and activities accommodated in the Port of Thessaloniki, the following ten (10) distinct sectors can be identified:

- a) Sector I comprises of Pier 1 and mainly serves administrative, cultural and recreational activities.
- b) Sector II comprises the quay between Pier 1 and Pier 2 and also the western part of Pier 2 and accommodates the Cruise and Ferry Terminals where services and amenities to cruise and ferry ships, passengers, and vehicles are being provided.
- c) Sector III occupies the land area adjacent to Pier 2 and serves various administrative and support activities of the Port of Thessaloniki (including without limitation parking areas, warehouses and sheds, Coast Guard offices, Custom offices as well as workshops needed for the maintenance of port infrastructure)
- d) Sector IV includes 6 buildings of preserved architecture.
- e) Sector V includes the western part of Pier 2, the entire Pier 3 and the quay between them. It accommodates various port activities outside the Free Zone of the Port of Thessaloniki. It also supports ancillary port activities.

- f) Sector VI occupies the land area adjacent to Piers 3 and accommodates administrative and support activities.
- g) Sector VII occupies the land area adjacent to Piers 4, 5 and 6. It is part of the port's Free Zone and serves various activities related to the Conventional Cargo Terminal. It includes warehouses and other small buildings.
- h) Sector VIII is the largest port sector and comprises of Piers 4, 5 and the eastern part of Pier 6 as well as the quays between the above piers. It accommodates and comprises of the port's dry bulk and conventional cargo terminal. It is part of the port's free zone and includes large warehouses and it is connected to the railway network of the port.
- i) Sector IX comprises the western quay of Pier 6 and the largest part of Pier 6 yard area. It accommodates the port's container terminal. It is part of the port's Free Zone and is connected to the railway network of the port. The Container Terminal has been designed and is operating based on state-of-the-art technologies and has the corresponding equipment for handling containers. It has a length of 570 meters and ships with depth up to 12 meters can be accommodated there. Its operating space extends over 32 ha, configured so as to handle the delivery and receipt of containers.
- j) Sector X refers to the area north of Pier 6. It includes two discrete parts, one within the port's Free Zone and one outside of it. It serves both the conventional and container terminal, for cargo storage and empty containers stacking, respectively.

In the following figure the division of the Port of Thessaloniki per activity is presented.

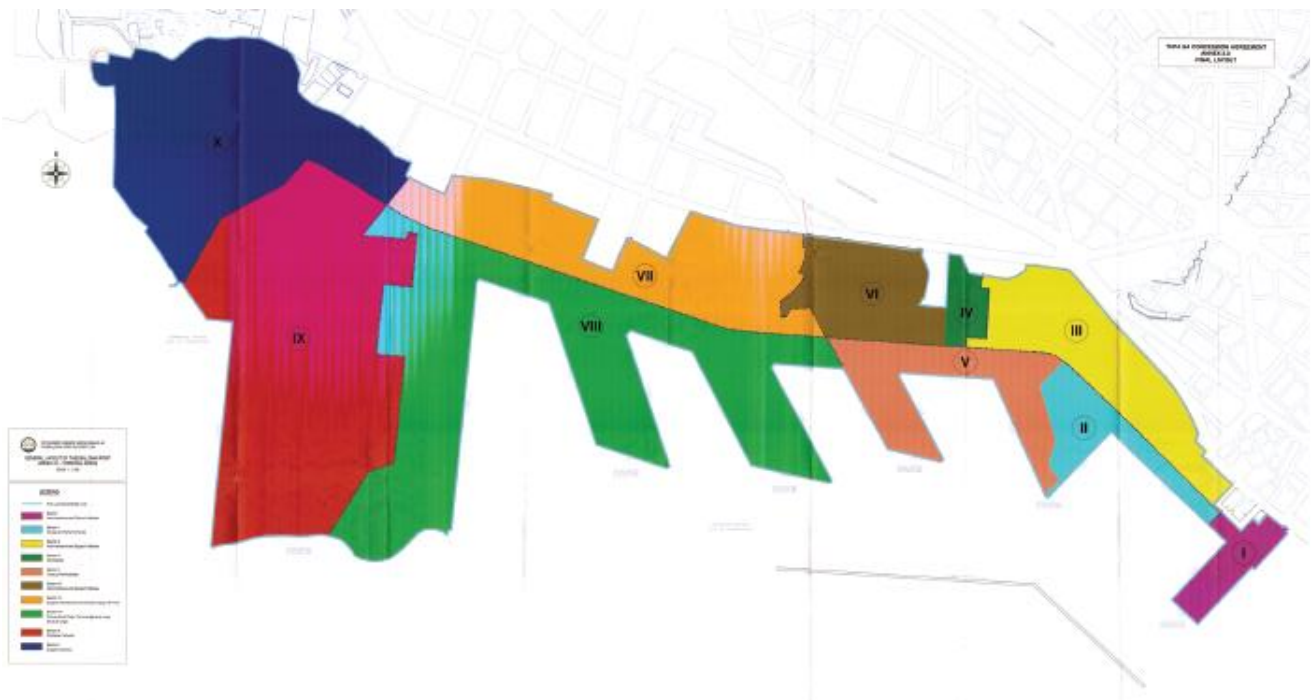


Figure 3: Division of port sectors per activity

2.6 Assets for the provision of services

ThPA SA holds assets for the provision of services. These assets include the following mechanical equipment:

- Thirty three (33) electrical cranes on rails with lifting capacity varying from 3 tons to 112 tons. Unloading productivity varies from 50 tons to 300 tons per hour.
- Five (5) mobile cranes with lifting capacity varying from 15 to 150 tons, the productivity depends on the type of the handled cargo.
- Sixty two (62) forklifts with lifting capacity varying from 2 to 37 tons and twenty eight (28) loaders/excavators with power engine from 78 to 350HP.
- 4 Ship to Shore Cranes for handling containers.
- 18 straddle carriers.
- 37 derricks, and various other loading equipment.

Furthermore, the ThPA SA has developed a state-of-the-art digital communication network, by installing optic fibres for setting up a Backbone Network with the total length of fibres exceeding 75 kilometres. The specialized software applications are already exploited for a large part of the port's operations, mainly the Financial Services, Statistical Data processing, Human Resources Management, Maintenance, Document Organization and Management and the Container Terminal Management.

2.7 Seaborne traffic

The following table provides statistical information regarding the seaborne traffic in the Port of Thessaloniki.

Seaborne traffic							
YEAR	2018			2017			Difference
	IN	OUT	TOTAL	IN	OUT	TOTAL	%
TOTAL THROUGHPUT	9.508.731	3.380.046	12.888.777	9.673.023	5.907.053	15.580.076	-17,27
LIQUID BULK	4.895.236	1.732.752	6.627.988	5.717.662	1.992.378	7.710.040	-14,03
Crude oil	2.833.047	0	2.833.047	3.350.133	0	3.350.133	-15,43
Refined (petroleum) products	1.752.183	1.732.752	3.484.935	2.085.814	1.992.378	4.078.192	-14,55
Gaseous, liquified or compressed petroleum products and natural gas	290.029	0	290.029	258.816	0	258.816	12,06
Chemical products	19.977	0	19.977	22.899	0	22.899	-12,76
Other liquid bulk	0	0	0	0	0	0	-
DRY BULK	2.218.818	1.190.260	3.409.078	1.769.766	1.417.122	3.186.888	6,97
Cereals	27.551	137.499	165.050	30.085	91.480	121.565	35,77
Foodstuff/Fodder/Oil seeds	199.714	1.501	201.215	207.420	4.952	212.372	-5,25
Coal and lignite	372.504	0	372.504	320.988	0	320.988	16,05
Ores/cement/lime/plasters	1.232.793	975.981	2.208.774	953.384	1.205.632	2.159.016	2,30
Metallurgical Products	207.297	29.080	236.377	98.708	0	98.708	139,47
Chemical products	170.107	0	170.107	150.155	0	150.155	13,29
Other dry bulk	8.852	46.199	55.051	9.026	115.058	124.084	-55,63
GENERAL CARGO	2.394.677	457.034	2.851.711	2.185.595	2.497.553	4.683.148	-39,11
Containerized (including Ro-Ro containers)	1.946.971	240.162	2.187.133	1.763.957	2.297.128	4.061.085	-46,14
Ro-Ro (excluding Ro-Ro containers)	26.220	63.200	89.420	27.230	66.458	93.688	-4,56
Other general cargo	421.486	153.672	575.158	394.408	133.967	528.375	8,85
ADDITIONAL INFORMATION (in units)							
Number of Vessels			1.929			1.936	-0,36
Number of Passengers	20.530	22.442	44.474	23.809	24.130	50.363	-11,69
Cruise Passengers			1.502			2.424	-38,04
Non Cruise Passengers	20.530	22.442	42.972	23.809	24.130	47.939	-10,36
Number of Containers/TEU	213.512	210.988	424.500	202.632	199.315	401.947	5,61
Empty	64.101	31.175	95.276	69.247	26.787	96.034	-0,79
Loaded	149.411	179.813	329.224	133.385	172.528	305.913	7,62
Number of Containers	145.013	144.394	289.407	137.669	136.187	273.856	5,68
Empty	48.533	17.413	65.946	51.705	14.469	66.174	-0,34
Loaded	96.480	126.981	223.461	85.964	121.718	207.682	7,60

* Tare weight included

Figure 4: Seaborne traffic in the port of Thessaloniki during 2017-2018.

2.8 Passenger terminal

The passenger terminal of the port of Thessaloniki is located between Piers 1 and 2 and has a quay of a total length of 400m with a depth of 8m. The quay has 4 positions, for stern berthing and 1 for berthing alongside the pier or alternatively, 3 for berthing alongside the pier, (for the provision of services to cruise ships mainly). Vessels with a draught of up to 9m can berth alongside the pier with the installation of a special construction.

The port basin provides sufficient space and depth for cruise ship maneuvering and is well protected from the weather conditions (winds, waves, etc.) by a wave-breaker, while ensuring the safe harboring of ships. Passenger traffic is facilitated by a modern, cruise-passenger terminal located near the city center (500m). The "Macedonia" cruise passenger terminal that operates on a 24hour-7days/week basis, is hosted on the ground section of a renovated neoclassical building and serves passengers of passenger-ships and ferryboats, flying dolphins and cruise-ships.

The terminal's high-quality specifications and modern facilities meet the requirements of the Schengen treaty and the ISPS code. It includes Duty Free shops, an Info kiosk and Wireless Access Points that contribute to the creation of a friendly environment and to the provision of high-quality services to all passengers.

2.9 Cruise operation

The city of Thessaloniki, capital of the Prefecture of Central Macedonia, is a modern, European multi-cultural city in the centre of Northern Greece and the second-largest city in the country. It has a population of one million inhabitants and is the second most important financial, industrial and political centre in Greece as well as a significant traffic hub for the rest of South-eastern Europe. The port of Thessaloniki is a gateway to the broader area of Northern Greece and the Balkan Peninsula. Thessaloniki and also its peripheral area, (Chalkidiki, Pieria, Dion, Pella, Vergina), constitute points of special tourist interest, adorned by monuments from various historical periods (Ancient Greece, Roman Period, Byzantium).

Even if during the years 2017 and 2018 (figure 5) there was a significant drop in the cruise vessels calling to the port, it is of major importance for the ThPA management planning to upgrade of the port's infrastructure for the cruise ships and sea tourism but also to restart short-sea-shipping operations to / from the islands of the Aegean Sea.

Passengers by route type, action				
2018				
	Disembarkation	Embarkation	Transit	Total
Domestic Routes	20.530	22.442	0	42.972
Yacht	0	0	10	10
Domestic Cruises	0	0	0	0
International Cruises	129	113	1.260	1.502
Total	20.659	22.555	1.270	44.484
2017				
	Disembarkation	Embarkation	Transit	Total
Domestic Routes	23.809	24.130	0	47.939
Yacht	0	4	6	10
Domestic Cruises	0	0	0	0
International Cruises	2	1	2.421	2.424
Total	23.811	24.135	2.427	50.373
2016				
	Disembarkation	Embarkation	Transit	Total
Domestic Routes	25.542	25.091	0	50.633
Yacht	0	0	0	0
Domestic Cruises	0	0	0	0
International Cruises	465	308	18.102	18.875
Total	26.007	25.399	18.102	69.508

Figure 5: Number of passengers by route type and action

2.10 Port's competitive environment

The port's competitive environment is determined by its geographic location, the type, origin/destination of the transported cargoes, the quality and cost of the services rendered and includes of ports with different operating features.

The wider geographic territory at present served by the Port of Thessaloniki is:

- the Northern Regions of Greece
- the Republic of Northern Macedonia, South Western Bulgaria and Southern Serbia.
the Black Sea countries.

ThPA SA intends to attract new major clients from the Republic of North Macedonia, SW Bulgaria and North Serbia by upgrading its infrastructure, procuring of the necessary equipment and, in parallel, improving the performance of its marketing and sales services.

The potential for attracting cargoes that are today accommodated by the ports of Alexandroupolis, Kavala, Stavros, N. Moudania and Volos is limited. However, with regard to the handling of containers, competition is low, since no other port in northern Greece possesses the necessary infrastructure and means required to handle containers. It is expected that the ports of Alexandroupolis and Kavala will hold a small market share following the completion or realization of their development plans.

The key clients of the Company are industries, shipping agents, container transportation companies, freight transport companies (companies which undertake the transport of merchandise cargo), while its sales are marketed via (a) a system of collaborating shipping agents who represent third parties (companies engaged in the transportation of containers, the trade of cereals, the trade of minerals, steelworks etc); and (b) by direct contact and negotiation between ThPA S.A. and the officers of the clients.

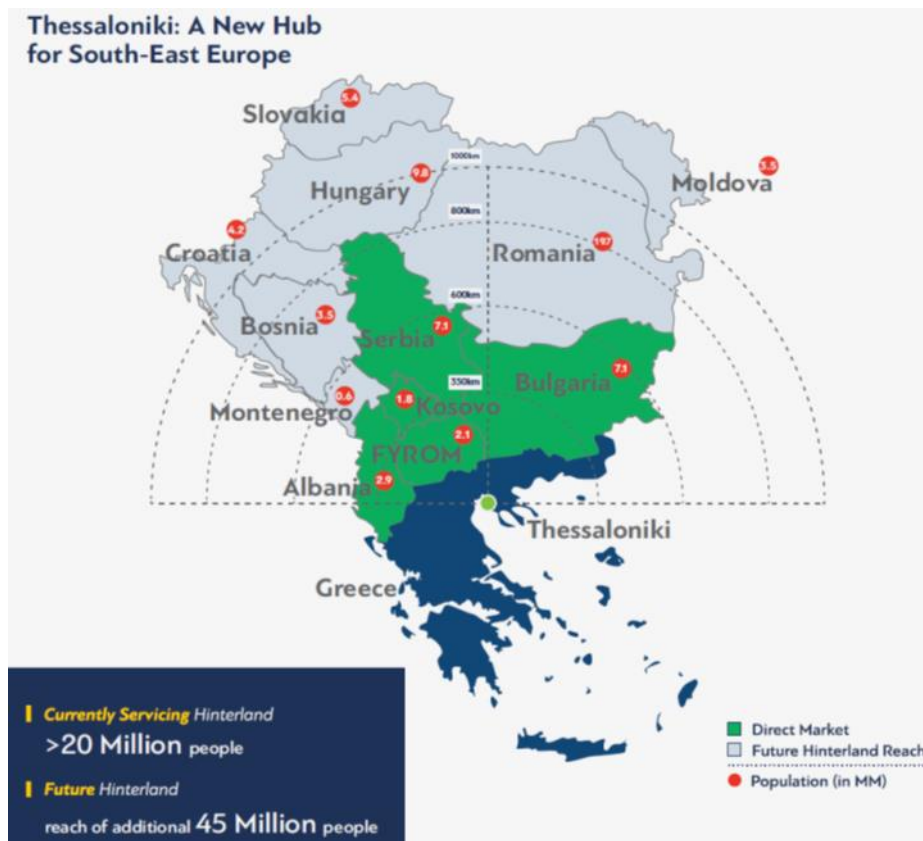


Figure 6: Port of Thessaloniki catchment area

2.11 Certifications

THPA S.A. is certified to global standards such as ISO 9001:2008 for the Management of the Container Terminal, ISO 9001:2008 for the Management of Solid Bulk Cargoes with the exception of cereals, and for serving passenger and cruise ships, standard 1429:2008 of the Hellenic Body for Standardization for Heavers Work and Mooring Services, as well as for Planning, Maturing and Materialization of Public Technical Works and Public Procurement and Services Agreements.

ThPA SA is the first Port Authority in Greece certified according to the international standard ELOT 1801:2008 / BS OHSAS 18001: 2007 for the Occupational Health and Safety Management System. The certification covers all activities of ThPA SA. The implementation of this international standard by the port is an explicit commitment to the prevention of accidents at work and occupational diseases, with a view to continuously improve the effectiveness of the management system for health and safety at work.

Since October 2015, the Port of Thessaloniki has been implementing an Environmental Management System for all the port operations accredited according to ISO 14001:2004. More specifically, the following fields are covered: “Berthing of commercial ships, loading and unloading of bulk cargoes and containers, storage and handling of merchandise and other goods and berthing of passenger and cruise ships. Concession of spaces for commercial and cultural activities”. Being a member of EcoPorts from 2002 and receiving the PERS certification were also very important steps to acquire the ISO 14001:2004 certification and helped the port to recognise the main environmental aspects and impacts as well as to set environmental objectives and targets.

2.12 Regulatory framework

2.12.1 Ministry of Shipping and Island Policy

The Ministry of Shipping and Island Policy is responsible for setting the National Port Policy, which is revisited every 5 years. By virtue of article 107 of Law 4389/2016, as in force, the General Secretariat of Ports, Port Policy and Maritime Investments of the Ministry of Shipping and Island Policy is in charge for the development and implementation of an integrated policy and strategy for the organization, development and exploitation of the country’s ports. In particular, the current National Port Policy that is in force and among its objectives are the business development of the ports as well as their specialization based on business criteria, distinguishing port administration from port operation, attracting private investments and granting business rights (by way of concession agreements) to reputable business groups.

By virtue of article 2 of Law 4150/2013 (Government Gazette A’ 102/29.4.2013), as in force, the Minister of Shipping and Island Policy has authority to supervise all aspects of the management, development and operation of the corporatized Port Authorities. Such competences are complemented by those envisaged in the Code of Public Maritime Law (Legislative Decree 187/1973), as in force, and elsewhere in applicable legislation.

2.12.2 Ports Regulatory Authority

Moreover, by virtue of article 108 of Law 4389/2016, as in force, a new regulator with the authority to regulate certain aspects of the Greek port system, namely the Ports Regulatory Authority (the “PRA”), has been established. The PRA is an Independent Administrative Authority, which is in general aiming to supervise and ensure the legality of the relations between public and private sector entities of the national port system, emphasizing in particular to the compliance of the contractual order and the implementation

of the legislation of free competition, and without prejudice to the competences of the General Secretariat of Ports, Port Policy and Maritime Investments.

The PRA has been assigned with the following regulatory powers and competences: 1) monitoring the implementation of the terms and provisions of the concession agreements in ports, especially with regard to compliance with competition rules, financial goals and the agreed levels of service; 2) monitoring the compliance of the ports' obligations with the national and European legislation, regarding public procurement, concession agreements and competition rules; 3) the obligation to provide public services to the port sector in accordance with the concession agreements and the competition rules; 4) mediating and resolving disputes between the port users and the port managing bodies, handling complaints and taking binding decisions regarding such complaints in due time in any issue of its competence; 5) supporting the competent authorities which compile specifications for public contracts (concessions) and the relevant renewals which are proposed by the port managing bodies, monitoring the implementation of the terms of the public contracts, by ensuring in particular compliance with the agreed level of service, by identifying efficiency levels, levels of investments and jobs' creation and the compliance with the financial goals; 6) cooperating with the Competition Commission to ensure the accurate implementation of the antitrust law in the field, the prevention of abuse of dominant position, concerted practices, overpricing and other practices that distort competition; 7) framing and proposing necessary legislative provisions concerning any subject of its competence to the Minister of Shipping and Island Policy; 8) drafting and submitting reports concerning any subject of its competence to the jointly competent Ministry or Independent Authority; 9) exchanging information and cooperating with the relevant bodies of other countries-members of the European Union, as regards its responsibilities; 10) delivering its opinion on the methodology and on the determination of the port services' duties and on the port infrastructure duties, and also on other ports issues following a relevant query of the Ministry of Shipping and Island Policy; 11) exercising in the name and on behalf of the Greek Government its contractual rights which result from concession agreements (such as terminating or dissolving in any way such concession contract, determining and invoking the fulfilment of a resolutive condition or the non-occurrence of a suspensive condition, exercising intervention rights on the under concession assets and/or rights of succession in the concession agreement, referring to any judicial body of dispute resolution, such as courts or arbitral tribunals, and filing judicial petitions and remedies).

All the above can be exercised by the PRA after the prior consent of the Minister of Shipping and Island Policy or the Minister of Finance, unless such actions are requested by both Ministers, in which case the PRA must act accordingly. Any amendment of the concession agreement, however, shall be subject to the provisions that regulate its conclusion.

2.12.3 Development of port infrastructure

Special permits must be granted by the competent authorities for the development of port infrastructure and superstructure, which consists of 1) main harbor works, namely works that take place within the sea and land area and exclusively for the provision of port services, such as extension/improvement/protection works, silting, machine installation and any superstructure that directly serves port functions and 2) ancillary harbor works for the provision of services to the port users, that are indirectly connected to port functions, such as parking areas, recreation and restaurant areas, hotels, passenger stations, passenger transfer facilities, offices and shops. For the commencement of port development works, the following are required: 1) decision by the Board of Directors of the port operator; 2) compatibility check of the technical studies with the approved Master Plan of ESAL (Committee of Port Planning and Development).

The process for the granting of the permit is not hindered by the non-completion of the Development Program and the Master Plan of the port within the required by law period of 12 months. In any case, works executed within this period shall be included in the Development Program and Master Plan; 3) approval of environmental conditions pursuant to the provisions of Law 4014/2011 as in effect; 4) decision of the Minister of Shipping and Island Policy, which also constitutes the relevant permit for the execution of the works. This decision shall be issued within fifteen (15) working days from the submission of the application by the port operator. The aforementioned documentation under (1) and (3) should also be submitted with the application and 5) notification of the permit under (4) to the competent Port Authority is also necessary for the commencement of works.

2.12.4 Environmental regulations

In general, pollution prevention, environmental noise, contingency plans for dealing with pollution incidents (e.g. oil spill) as well as the management of waste oils, hazardous waste and other dangerous substances are regulated by several international, EU and national laws and regulations. In particular, Directive 2000/59/EC as amended by Directives 2002/84/EC and 2007/71/EC, and implemented in Greece by virtue of Ministerial Decision no. 3418/07/2002 as amended by Presidential Decree 3/2005 and Ministerial Decision no. 8111.1/41/09 contain provisions on port reception facilities for ship-generated waste and cargo residues. These provisions are applicable to: a) all ships, including fishing vessels and recreational crafts, irrespective of their flag, calling at, or operating within, a Greek port, with the exception of any warship, naval auxiliary or other ship owned or operated by the Greek State and used, for the time being, only on government non-commercial service; b) to all Greek ports normally visited by ships falling under the scope of point (a) above.

As regards other Greek ports where the above ships occasionally arrive, the provisions of their respective special ports' regulations apply, except if their port operators decide on the application of these law provisions. Furthermore, ships which are excluded from the scope of point (a) deliver their ship-generated waste and cargo residues in a manner consistent, in so far as is reasonable and practicable, with these law provisions. In broad terms, the legal provisions under the above referred legislation refer in detail to different aspects of waste disposal; e.g. the port operators' obligation to provide suitable waste disposal services and obtain permits, the submission by the port operators to the competent authorities of plans for the reception and disposal of waste, as well as ships' obligation upon arrival to inform the port and pay the relevant tariffs.

Having the promotion and protection of the environment as principal concern, ThPA SA possesses the following main environmental terms and approvals for the operation and for its works: "Ref. No 203978/12 Approval of environmental terms for the "Operation of the Port of Thessaloniki", as amended and it is valid today.

2.12.5 Labour related regulations

ThPA SA complies with all provisions and requirements of applicable Laws and regulations relating to employment, Collective Labour Agreements, Company-level Employment Agreements and labour relations, ratified International Labour Treaties, as well as Laws and Regulations in force on health and safety at work. There are company-level collective employment contracts, as well as regulations set by decisions of the Board of Directors of ThPA SA, such as the General Personnel Regulation, the Internal Organization and Operation Regulation, the Hygiene and Safety Regulation, etc.

2.12.6 Contracts and insurance

In terms of port's clients and suppliers, the rendering of services and the pricing thereof is uniform and irrespective of contracts. The conclusion of contracts is part of the business policy by ThPA SA to attract

clients and increase the cargoes handled by the Port of Thessaloniki. The contracts concluded afford easements to the clients in the context of a “Memorandum of Understanding”, without any exclusivity rights on the contracting parties as regards the provision of port services, beyond the short-term contracts the company concludes for the concession of sites.

Moreover, in order to secure its assets and also its liability against third parties and its personnel for damages, ThPA S.A. has insured its fixed equipment (machinery – tools – vehicles and vessels – buildings) conceded to it by the Greek State, against all risks and against civil liability and employer’s civil liability, as well as the cargoes of its clients against civil liability etc.

2.12.7 Legislation summary

The next list provides a summary of European legislation related to the environment that influences the port of Thessaloniki.

- The Birds and Habitats Directives, Natura 2000
 - Council directive of 2 April 1979 on the conservation of wild birds, Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora,
 - Managing Natura 2000-sites,
 - 2009 Environment Policy Review,
 - Communication from the Commission to the European Parliament, the Council, The Economic and Social Committee and the Committee of the Regions. Our life insurance, our natural capital: an EU biodiversity strategy to 2020,
 - Estuary Guidelines 2011
- Sulphur Content of Marine Fuels
 - Council directive 1999/32/EC of 26 April 1999 relating to a reduction in the sulphur content of certain liquid fuels and amending Directive 93/12/EEC,
 - Directive 2005/33/EC of the European Parliament and of the Council of 6 July 2005 amending Directive 1999/32/EC relating to the sulphur content of marine fuels
- Pollution from Ships
 - Regulation (EC) No 2009/2002 of the European Parliament and of the Council of 5 November 2002 establishing a Committee on Safe Seas and the Prevention of Pollution from Ships (COSS) and amending the Regulations on maritime safety and the prevention of pollution from ships,
 - Directive 2005/35/EC of the European Parliament and of the Council of 7 September 2005 on ship-source pollution and on the introduction of penalties for infringements)
- Greenhouse Gas Emissions
 - Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community’s greenhouse gas emission reduction commitments up to 2020,
 - Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC
- Port Reception Facilities
 - Directive 2000/59/EC of the European Parliament and of the Council of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues

- Directive (EU) 2019/883 of the European Parliament and of the Council of 17 April 2019 on port reception facilities for the delivery of waste from ships, amending Directive 2010/65/EU and repealing Directive 2000/59/EC
- Water Framework Directive
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy
- National Emission Ceilings
- Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants
- Directive (EU) 2016/2284 of the European Parliament and of the Council of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC
- Environmental Noise
- Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise
- Regulation (EU) 2019/1010 of the European Parliament and of the Council of 5 June 2019 on the alignment of reporting obligations in the field of legislation related to the environment, and amending Regulations (EC) No 166/2006 and (EU) No 995/2010 of the European Parliament and of the Council, Directives 2002/49/EC, 2004/35/EC, 2007/2/EC, 2009/147/EC and 2010/63/EU of the European Parliament and of the Council, Council Regulations (EC) No 338/97 and (EC) No 2173/2005, and Council Directive 86/278/EEC
- Soil Framework Directive
- Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage,
- Regulation (EU) 2019/1010 of the European Parliament and of the Council of 5 June 2019 on the alignment of reporting obligations in the field of legislation related to the environment, and amending Regulations (EC) No 166/2006 and (EU) No 995/2010 of the European Parliament and of the Council, Directives 2002/49/EC, 2004/35/EC, 2007/2/EC, 2009/147/EC and 2010/63/EU of the European Parliament and of the Council, Council Regulations (EC) No 338/97 and (EC) No 2173/2005, and Council Directive 86/278/EEC
- Regulation on Shipment of Waste
- Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste
- Council Regulation (EEC) No 259/93 of 1 February 1993 on the supervision and control of shipments of waste within, into and out of the European Community
- Corrigendum to Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste
- Waste Framework Directive
- Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain directives
- Marine Strategy Framework
- Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy
- Commission Directive (EU) 2017/845 of 17 May 2017 amending Directive 2008/56/EC of the European Parliament and of the Council as regards the indicative lists of elements to be taken into account for the preparation of marine strategies
- Supplementary Directive on Priority Substances

- Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council
- Directive 2013/39/EU of the European Parliament and of the Council of 12 August 2013 amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy
- Ambient Air Quality
- Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe
- Commission Directive (EU) 2015/1480 of 28 August 2015 amending several annexes to Directives 2004/107/EC and 2008/50/EC of the European Parliament and of the Council laying down the rules concerning reference methods, data validation and location of sampling points for the assessment of ambient air quality
- Maritime Spatial Planning
- Communication from the Commission. Roadmap for Maritime Spatial Planning: Achieving Common Principles in the EU
- Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Maritime Spatial Planning in the EU – Achievements and future development

2.13 Goals and strategies

The port of Thessaloniki is the first transit port in Greece with respect to conventional cargo. It is the European Union port nearest to the Balkan and the Black Sea Zone countries, offers safety to the cargo in transit and possesses a natural sea entrance which may cater for ships with deep drafts. One of its advantages is the Container Terminal, operating on a 24-hour basis with fixed rates, the operation of the conventional Port with two shifts and high level equipment and the “Free Zone” which is one of the 27 in operation throughout the European Union and aimed to principally facilitate and develop trade between EU Member-States and third countries. The strategy of the company aims at the increase of its shareholders’ assets by:

- maintaining the important (dominating) position the port holds with respect to its area and elevating it to become the principal port in the Balkans;
- reinforcing its role in Eastern Mediterranean as a center for combined transport, and
- evolving into a transit hub and important Regional Port-Gateway for the South-eastern European markets, where a significant share will be held by the handling of containers in transit.

Towards these, the port seeks:

- to reinforce its competitive position by improving its efficiency and adopting an appealing pricing policy;
- to increase its profitability by improving its operating margin, attracting cargo, decreasing costs and providing new integrated port logistics services, oriented toward Third Party logistics (3PL) services;
- to improve the quality of the services rendered by means of its investment and modernization programme, as well as the extension of port infrastructure and superstructure, personnel training and the upgrading of technological infrastructure by the implementation of advanced software suites and the development of specialized computerized applications;
- to further develop the Container Terminal.

The main axis of the Company's pricing policy is to maintain the prices for its services at a competitive level, compared to the other ports of the area, aiming to attract in this way additional customers. For this reason and taking into account the global economic crisis which made its appearance in 2008, the prices of the loading/unloading services for transit cargo have remained at the same level since 2007. Furthermore the prices for conventional cargo have been kept at the same levels in 2017. Cargo is handled and priced based on special agreements (contracts) signed by ThPA S.A. and its clients, following a raise by 7% in 2008. Moreover, further discounts were granted for transit cargoes since 2010. For 2017, the pricing policy that was followed was the same as that for 2016 and 2015 and the price list was kept at the same levels without any further increases but with small scale differentiations.

A key objective is also the attraction of new freight volumes and the provision of value added services combined with safety and expedience in the handling thereof. It is for this that ThPA continuously strives to modernize and renovate its relatively new mechanical equipment and further develop its infrastructures, financing these investments from its available funds.

According to a recent top management's announce, the port's strategy includes the following axis:

- Restoring of the proper functioning of the port
- Procurement of state-of-the-art container-handling equipment
- Reorganisation of ThPA SA and development of a customer-centric culture
- Immediate commencement of mandatory investments with the expansion of Pier 6 and the creation of a new container berth for New Panamax and mainline vessels serving as a key objective
- Development of beyond-the-port activities

It should be also highlighted that the new management of the port ("South Europe Gateway Thessaloniki (SEGT) Ltd") has agreed to spend 650 million euros on upgrading the port's facilities over the 34-year concession that it was granted with. The facilities have not had any major upgrade since the 1990s.

The near-term business plan foresees 180 million euros invested over seven years to develop a number of projects. Notably, this includes the extension of the container terminal by 440 meters and dredging works that will increase the port's depth to 16.5 meters, which is a strategic target since New Panamax vessels will be able to be accommodated. The port therefore will be in a position to serve mainliners, originating for example from East Asia. An additional 28 million euros will be invested in replacing obsolete equipment. The port also plans to develop a freight centre — to be tendered by Greek state-owned railway property management and development company GAIAOSE — as well as further advance its attractiveness as a cruise port of call.

The redevelopment of the Port of Thessaloniki goes far beyond upgrading a port to touch most parts of the city's infrastructure and economy. This include processing and logistics and have the potential to turn Thessaloniki into the region's top transit and logistics hub. Indeed, the port has traditionally been the main hub for Southeast Europe and the Balkans, especially the landlocked Republic of North Macedonia, Bulgaria and Serbia. With the World Bank estimating that the Western Balkans' GDP will increase by 3.5 percent in 2018, and by a further 3.8 percent in 2020, this places the Port of Thessaloniki in an advantageous position to become a driver of trade within the region. But now, the port has the potential to expand farther — to other European countries and even Asia, since it lies along China's Belt and Road Initiative.

Regarding the sustainability of the port in terms of its environmental vision, the following table summarizes the intervention areas which are the step to tackle the main environmental aspects that exist today in the port and thus improve its sustainability.

Table 1: Goals and Strategies

Goal	Strategy
Improve air quality.	<ul style="list-style-type: none"> • Keep the emissions (SO_x, NO_x, CO₂, PM) under the specified by the legislation limits. • Systematic measurement of the air pollutants' concentration and comparison with the applied limits.
Improve energy consumption.	<ul style="list-style-type: none"> • Reduce the carbon foot print by 5% in the next 2 years. • Monitor and review fuels and electricity consumption per year.
Improve the accessibility and mobility of trucks entering the port area.	<ul style="list-style-type: none"> • Reduction of the engine operational time. • Reduction of the trucks waiting time. • Systematic measurements of the trucks' engine operational time and waiting time.
Keep the noise levels at port's perimeter under the limits specified by the competent legislation.	<ul style="list-style-type: none"> • Systematic measurement and review of noise levels. • Production of relevant noise maps.
Keep "Zero" incident at port staff and users due to truck flow within port area.	<ul style="list-style-type: none"> • Registry of incidents. • Informing of port users and staff

2.14 SWOT Analysis

The perspectives and the development model for the port have been clearly expressed by the Chairman of BoD and Chief Executive Officer of ThPA SA: "The prospects for the Port of Thessaloniki are extremely positive and we will concentrate our efforts to strengthen its position in the South-eastern European port services market. We are ready to implement our investment plan and we will keep open channels of communication with all stakeholders. I am convinced that the Port of Thessaloniki has the prospects to become a hub of strategic interest for Mediterranean, the Balkans and South-eastern Europe and play a leading role in the development of Northern Greece".

The Company's business strategy is to strengthen safety, improve quality of service and customer satisfaction and enhance productivity through better organization, training and state of the art equipment. The challenge will be to make the Port an agile organization able to cope with a rapidly changing environment and to identify new services and new opportunities. The Company considers that it has the human resources, the port management expertise and the financial capacity to successfully execute its strategy.

Based also on the above, the following SWOT analysis is a basic framework that assesses what the port of Thessaloniki can and cannot do, considering both internal and external factors. Using environmental data to evaluate the position of the company, the SWOT analysis determines what assists the port in accomplishing its objectives, and what obstacles it must overcome or minimize to achieve desired results: where the Authority is today, and where it may go.

When using SWOT analysis, the port needs to be realistic about its good and bad points. The port needs to keep the analysis specific by avoiding grey areas and analysing in relation to real-life contexts. For example, how do the port's services compare to those of competing ports?

The analysis is short and simple, and complexity and over-analysis is avoided as much of the information is subjective. Thus, it should be used as a guide and not a prescription.

The basic elements of the SWOT analysis are the following:

- *Strengths* describe what the port excels at and separates it from the competition: a strong brand, adequate infrastructure and depths, certification with international standards, a strong balance sheet, unique technology and so on.
- *Weaknesses* prevent an organization from performing at its optimum level. They are areas where the business needs to improve to remain competitive: inadequate depths, an inadequate supply chain or lack of capital.
- *Opportunities* refer to favorable external factors that the port can use to give it a competitive advantage.
- *Threats* refer to factors that have the potential to harm the port sustainability. For example, increasing competition, instable financial situation and so on.

Table 2: SWOT analysis for the port of Thessaloniki

Strengths	Opportunities
<ul style="list-style-type: none"> • The advantageous position of the port, as it is at the crossroads of the land transport networks, between East and West through the Egnatia Motorway, South - North via the Patras - Athens - Thessaloniki - Evzonon motorway (PATHE). • Its superiority in the Balkan hinterland, being a gateway for Serbia and Bulgaria in the Mediterranean through the valleys of Axios and Strymon. • Stable relationship with the main users of the port and the possibility of contracting, in case of large cargo traffic, with discount rates. • Little distance from the Skopje, Kosovo and southern Bulgaria markets. • Possibility of extending the port to the west. • Good road and rail connections to the corresponding European transport networks. • The existence of double / triple railway tracks along all port's quays. • The existence of a Free Zone (Type I Control) in accordance with the European Union Customs Codes and the possibility of continuous storage in it. • The Container Terminal operates on a 24-hour basis at all times of the year with a flat rate. • The Integrated Management Information System of the Container Terminal. • Safety conditions in accordance with the International Ship and Port Facility Security Code (ISPS). • The transport of dangerous goods according to the conditions of the existing legislation. • The certification with the standards ISO9001, ISO 14001, EAOT 1429 and OHSAS18001. • The adoption of an Environmental Policy. • Port personnel are certified to ISO 9002 and trained according to the ILO's PDP program of the International Labor Organization (ILO). • Operation of an independent environmental department (2004): Department of Environment, Health and Safety of Workers. 	<ul style="list-style-type: none"> • Promoting and strengthening the port's good profile due to its certification with environmental and qualitative standards. • The integrated approach to environmental and other issues between the port and the city through cooperation with productive, educational institutions, such as the Municipality of Thessaloniki, the Aristotle University and the Chambers of Commerce. • The highlighting of the historical development of the port and its maritime front. • The promotion of the port as a tourist portal for the city and the wider region, resulting in the economic development of the city through the development of the harbor. • The planned expansion of the 6th pier in order to provide integrated port and logistics services. • The most appropriate strategic orientation for Third Party Logistics (3PL). • The participation of ThPA in research, where it is expected to contribute to the transfer of know-how and to the monitoring of modern trends of safe, environmental and quality service. • The growing economically wider region of the Balkans and South-eastern Europe. • The links with eastern and central Europe through Trans-European Transport Networks. • Developed national environmental legislation and programs harmonized with the EU environmental regulatory framework. • Implementation of a port-oriented environmental policy. • Legally established system for monitoring and control of the activities for environmental protection. • Increased demands on protection of the environment in the area around the port in order to develop priority sectors for the town of Thessaloniki. • Availability of EU financial instruments for support of port operations management and environmental protection.

<ul style="list-style-type: none"> • The compliance with applicable environmental and rest legislation, both national, European and international. • The existence of an adequate ships waste reception and handling plan, and a relevant competitive fee system. • Transshipment, directly or through the quays, without customs formalities. • The declaration from the new top management for a strong investment plan the next seven years. • Available programmes and technological documents for environmentally sound management of ports according to the national, European and international legislation. • Implementation of a port environmental monitoring programme. • Application of various environmental protection activities. • Communication policy for informing the society about initiatives taken to protect the environment. • Establishment of an integrated system for the collection of waste and cargo residues from ships. 	<ul style="list-style-type: none"> • Participation in European projects.
<p>Weaknesses</p> <ul style="list-style-type: none"> • Employee strikes. • Dredging is required at the quays that serve bulk dry cargo (coal and iron ore) so that the port can easily serve Panamax ships. • Traceability and reduced efficiency of part of the loading / unloading equipment. • Old rail lines in some port areas. • Lack of a logistics center within or near to the port. • Inadequate draft for large ships at the passenger and container terminal. • Continuously declining number and old-age dock workers. • Absence of a car terminal in order to further differentiate port services. • Lack of efficient and regular rail links with countries in the southern Balkans. • Absence of an inland terminal (depot) in the ThPA inland (e.g. in Skopje). • Inefficiencies in Gate management. • Weak integral policy for sustainable development of the port based on the Integrated Coastal Zone Management (ICZM) approach. • Ineffective utilization of raw materials, supplies and energy. 	<p>Threats</p> <ul style="list-style-type: none"> • The complexity, in many cases, of the Greek and European legislation. • The lack of a joint environmental management plan between the port and the city. • The problems of integrating the port into the urban fabric of the city. • The inadequate mass transport infrastructure and, consequently, the heavy traffic congestion. • Emissions generated from dry bulk cargo handling dust. • The existence and development of other competitive harbors (e.g. Varna, Durres, Bar, Goia Tauro, Istanbul, Trieste, Bourgas, Smyrna). • The climate of economic uncertainty in the domestic market and globally. • Insufficiently effective economic incentives and sanctions for environmental protection. • Complicated, in some cases, environmental legislation. • Expected increase in ship call and cargo turnover in the port, which is potential danger to environment protection.

3 Stakeholder consultation

The SUPAIR focus group meeting in Thessaloniki Port Authority (THPA) took place on 13/04/2018. The event was organized by the Thessaloniki Port Authority in its Headquarters and more specifically in the Central Administration Building, 1st Pier, inside the Board of Directors Hall. The meeting started at 9:00 and was concluded at 14:00. The Focus Group discussion was moderated by Prof. Aristotelis Naniopoulos, from the Department of Civil Engineering, Division of Transport and Project Management of the Aristotle University of Thessaloniki.

The following table summarizes the results of the focus group session where all relevant stakeholders shared their views on the selected actions.

NAME OF THE PARTICIPANT	STAKEHOLDER CATEGORY	RELEVANT STAKEHOLDERS (Name of the Organization)	INVOLVED IN THE FOCUS GROUP (Yes or not)	Contribution of the Sustainable and Low-carbon Port	
				NEEDS (list 2/3 of the main relevant needs)	INVOLVEMENT IMPACT (Involvement: indicate if easy, medium, difficult Impact on the sector: indicate if small, medium, large)
Sotirios Theofanis (Chairman of the BoD and Chief Executive Officer), Rui Pinto (Deputy Chief Executive Officer and Chief Commercial Officer), Giannis Ioannidis, Lazaros Ladopoulos, Panagiotis Theodosiou (Director of Development Division), Eva Vafaki (Head of Environment, Employee Health and Safety Department), Lazaros Xenidis	ThPA SA	Port Authority	YES	<ul style="list-style-type: none"> - the topic of the SUPAIR project is quite relevant to the challenges that the port is currently facing - the results of the project will be beneficial for Thessaloniki Port Authority - sustainability and environmental protection are among the priorities of the new management 	Involvement: easy Impact: large
Apostolos Milioudis, Evangelos Boutsiadis	ΔΕΔΔΗΕ ΑΕ / HEDNO S.A. (Hellenic Electricity Distribution Network Operator S.A.)	Electricity Distribution Network Operator / Enterprise	YES	<ul style="list-style-type: none"> - there is a potential for net metering use by the Port Authority, however some technical issues have to be examined beforehand - concerning telemetering service, it is installed for the electrical substations that operate in the port 	Involvement: medium Impact: medium

Maria Boile (Research Director), Anastasiadis Nikos, Lefteris Sdoukopoulos	Centre for Research and Technology Hellas (CERTH) - Hellenic Institute of Transport (HIT)	Public research Body	YES	<ul style="list-style-type: none"> - the exchange of views between local and regional stakeholders is a crucial element for the success of the SUPAIR project - CERTH is a technical partner of SUPAIR project 	Involvement: easy Impact: large
Prof. Aristotelis Naniopoulos, Dr. Georgios Palantzas, Kostantina Karagouni	Aristotle University of Thessaloniki / Department of Civil Engineering, Division of Transport and Project Management	University	YES	<ul style="list-style-type: none"> - Thessaloniki Port has a history of at least 16 years in environmental management including various achievements such as the PERS award, the membership in the ECOPORTS network of ESPO and the ISO 14001 certification - according to ESPO, air quality and energy consumption are the top two priorities in the European ports sector and SUPAIR correctly focuses on these issues - need for cooperation between all stakeholders of the port community 	Involvement: medium Impact: medium
Grigorios Sivenas	Zeniθ	Natural Gas Provider / Entreprise	YES	<ul style="list-style-type: none"> - it is very important for the Thessaloniki Port Authority to know where most energy consumption takes place, in which building or machinery - there is a special pricing policy for customers who use both natural gas and electricity 	Involvement: medium Impact: medium
Anna Lempesi, Elisavet Zampaoglou	A' Customs office of Thessaloniki (Import Export)	Local public Authority	YES	<ul style="list-style-type: none"> - there is a need to speed up the processes related to the customs control - the envisioned truck flow management system is an innovation that will provide significant benefits 	Involvement: medium Impact: medium

				<ul style="list-style-type: none"> - the customs office is open for collaboration with the new board of the port 	
Georgios Iliadis	Professional Chamber of Thessaloniki / Chairman	Enterprise	YES	<ul style="list-style-type: none"> - mode choice is not only dependent on infrastructure, but it is also market driven - trucks offer flexibility for cargo handling without the need for setting up expensive infrastructure - the use of train could be developed more if there is an adequate network of rail-terminals in the countries that are receiving the port-bound freight volumes 	Involvement: medium Impact: medium
Giorgos Dimarelos (Deputy Mayor of Urban Resilience), Lazaros Panagiotidis (Department of Operational Planning and Development), Maximos Petrakakis (Department of Environment), Apostolos Kelesis (Department of Environment)	Municipality of Thessaloniki	Local Public Authority	YES	<ul style="list-style-type: none"> - the municipality of Thessaloniki considers within its planning to transform the rail's entry point to the port into a traffic calming zone and move the train's access gate to the west side of the port - such a change would largely comply with the urban mobility planning of the Municipality 	Involvement: medium Impact: medium
Panagiotis Zamos (Department of Planning and Development Programs / Head of Department), Anastasia Nikopoulou (Department of Technical Services / Head of Department)	Delta Municipality	Local Public Authority	YES	<ul style="list-style-type: none"> - need to speed up the movement of vehicles in order to avoid congestion - the creation of a freight centre within the limits of the municipality will further increase the environmental pressure currently imposed - the port should be connected with the national road network through a separate road, the construction of which has been halted, in order to avoid the use of the 	Involvement: medium Impact: medium

				<p>local municipality network that is inappropriate for serving heavy loaded vehicles</p> <ul style="list-style-type: none"> - need of parking places for trucks outside the port, in order to reduce the pressure to the Gate 16 	
<p>Panagiotis Panagiotopoulos (Commercial Director), Kostantinos Theodoridis</p>	<p>ΔΕΗ ΑΕ / PPC SA (Public Power Corporation SA)</p>	Enterprise	YES	<ul style="list-style-type: none"> - pricing policy of PPC towards enterprises such as Thessaloniki Port Authority could be competitive - PPC is open to discuss the application of the GreenPass service for the port - need to increase rail cargo volumes from the port of Thessaloniki 	<p>Involvement: medium Impact: medium</p>
Vasilios Kampakis	Chairman of Naval Agents Association of Thessaloniki	Enterprise	YES	<ul style="list-style-type: none"> - need to increase the use of rail transport - need to increase the volume of cargo handled from the Port of Thessaloniki - train and truck could complement each other in transporting cargo if rail terminals are established in the hinterland - the truck flow management system study that is going to be implemented as part of ThPA SUPAIR Action Plan will be supported by the Naval Agents - Customs Office could speed up the truck operations - the long distance that exists between quays and the weighting facilities delay the truck operations. 	<p>Involvement: medium Impact: medium</p>

4 Evaluation framework

The goal is to define the overall evaluation framework for assessing the impacts of the proposed action plan.

The outputs of the evaluation framework are the following:

- Choosing the appropriate methods for assessing the expected impacts of the proposed action plan.
- Identification of all stakeholders involved in the realisation of the action plan.
- Identification of impact indicators to be used.
- Identification of required data according to the impact indicators.

The evaluation framework addresses the sustainability of the proposed actions from the very beginning. It should be emphasized that assessment relates to strategic port planning and addresses measures of different types and levels of maturity. As such, a general framework approach is suggested here to drive port project activities. During the implementation of the ports' low-carbon action plans, technical partners could assist port authorities to address specific needs depending on the specific action and local context characteristics.

Traditional evaluation methods will be employed, e.g. the Cost-Benefit Analysis (CBA) and Multi-Criteria Decision Analysis (MCDA), e.g. the Analytic Hierarchy Process (AHP), in order to estimate the impacts of the proposed actions.

The Framework will follow a before/after ("as is" vs "to be" scenarios) assessment approach. Indicators are selected to feed the assessment of the "as is" and "to be" scenarios. Such indicators are the following:

Sustainability issue	Assessment method	Impact indicator	Stakeholders involvement	Required data
Air quality	Keep the emissions (SO _x , NO _x , CO ₂ , PM) under the specified by the legislation limits.	Concentration of SO _x , NO _x , CO ₂ , PM	Port users (drivers) Port staff	Systematic measurement of the air pollutants' concentration and comparison with the applied limits.
Energy consumption	Reduce the carbon footprint by 5% in the next 2 years.	tCO ₂ /year	Port users (drivers) Port staff	Fuels and electricity consumption per year.
Noise	Keep the noise levels at port's perimeter under the specified by the legislation limits.	Level of dB(A)	Port users (drivers) Port staff	Systematic measurements of noise levels. Production of relevant noise maps.
Incidents	Zero incidents at port staff and users due to truck flow within port area.	Incidents	Port users (driving or by foot) Port staff	Registry of incidents.
Accessibility and mobility	Improve the accessibility and mobility of trucks entering the port area.	Engine operational time. Trucks waiting time.	Port users (drivers) Port staff	Systematic measurements of the trucks' engine operational time and waiting time.

Evaluation criteria, variables and indicators refer to the operational, financial, socio-economic and environmental dimensions of impacts. Additional innovative methods, including behavioural and agent-

based, could be employed to enrich the range of impacts considered and strengthen the overall evaluation framework.

Proposed evaluation methods take a multi-stakeholders, multi-criteria viewpoint. The requirements of various stakeholders should be taken into account. A method that offers such a viewpoint is the Multi-Actor Multi-Criteria Analysis (MAMCA). The overall methodology of this section after its finalization will include the following:

- Designing and developing the overall evaluation framework on the basis of appropriate selected methods;
- Identifying relevant stakeholders and correspondent objectives, needs, and requirements. This step is necessary to ensure that stakeholders' needs are successfully met;
- Identifying appropriate evaluation criteria and indicators;
- Identifying necessary data and information to be collected for the use cases following a before/after approach ("as is" vs "to be");
- Elaborating data to produce financial, socio-economic and environmental impact assessment.

5 Action plan solutions design

Considering the results of the Focus Group, it has been proven that the majority of stakeholders relevant to the Port of Thessaloniki, share a common vision for creating sustainable added value together, while reconciling economic, social and environmental interests. The Port of Thessaloniki aims to play a pioneering role in terms of sustainability considering that environmental protection should be a competitive advantage therefore environmental challenges must be tackled in a proactive, responsible and critical manner, without passing on environmental problems to other parts of society.

The basic principles of ThPA's vision are:

- To comply with local, national and international environmental legislation without disrupting the healthy competition with the neighbouring Hellenic and European ports.
- To choose to work with the best available practices and techniques.
- To choose to pass on charges to polluters and give incentives for greener shipping.
- To give priority to maximum efficiency with regard to the costs incurred for the port's environmental efforts.
- To contribute to a low carbon economy in the future, investing in energy management actions and projects.

Concerning the Port's sustainable vision, it should be also highlighted that the market in which the port of Thessaloniki is operating is changing rapidly and we will be facing various challenges. To stay resilient, ThPA should continue to strengthen its home base while retaining its global perspective as a Local-Hellenic-World port. Therefore in coordination and constant consultation with the local stakeholders, ThPA has been working to develop five strategic priorities so that the port of tomorrow is being built today. The strategic priorities of the Port of Thessaloniki are:

Sustainable growth. The port is being developed as a strong economic hub. By diversifying its activities, the port retains the added value and keeps employment up to scratch while strengthening the port's social support. This growth can only be achieved with respect for people and the living environment.

Smooth mobility. Smooth mobility and better accessibility are absolute priorities if the port wants to stay attractive as an economic partner and employer. Thessaloniki's geographical location is ideal for new and intermodal mobility solutions. ThPA works proactively on sustainable mobility and alternatives for both freight traffic and commuting. It is of absolute priority for the operation of the port but also for the adjacent municipalities to have the truck traffic flow into and out of the port as organized and smooth as possible, without putting a burden on the surrounding road network. Furthermore the technology of vehicle fleets is constantly improving so trucks can become more efficient if loaded more intelligently and ensure that the number of empty journeys is limited to a minimum.

Innovation and transition. The port of Thessaloniki wants to be an innovative launchpad. Working on the transition to an energy efficient port and to a low-carbon and circular economy will enable the port to keep up with the international climate commitments while further developing a sustainable port platform. The commitment to digitisation and data sharing will make the port's supply chain increasingly high-performance, more efficient and safer.

A safe home port. It is of absolute priority to make sure that the port of Thessaloniki is an attractive and fully safe location for its employees, customers and suppliers. The port is heavily investing in selection, training and support for its employees to be prepared for the wave of automation.

A cluster working together. ThPA SA smooths the way between current and new partners and stakeholders in order to be resilient to future challenges such as mobility, talent, sustainability and higher efficiency.

The key sustainability issues that would improve/influence Port's sustainable development are:

- Actions and solutions for achieving energy efficiency.
- Actions and solutions for reducing Greenhouse Gas and vehicles' exhaust emissions.
- Actions and solutions for improving air quality and minimise dust emissions.
- Actions and solutions towards a low-carbon economy.
- Improvement of port's accessibility and mobility.

In the context of the above, in view of the international policy framework and in the need for ensuring long-term sustainability level, ThPA SA has selected to focus its endeavour and further develop 3 specific actions in the context of the current Action Plan. These are:

- 1. Information system for monitoring energy consumption – Energy management database**
- 2. Transport study - Truck flow management**
- 3. Energy management plan**

With the implementation of these actions, the goals for the port of Thessaloniki are:

- to limit CO₂ and other air pollutants emissions,
- to control and manage other port environmental impacts such as noise,
- to improve the energy efficiency of the port,
- to decrease the burden of port related truck flows to adjacent municipalities,
- to make a smooth transition to a low-carbon economy,
- to make a step forward into digitalization and data sharing,
- to reserve the required resources for implementing these actions.

ThPA SA recognizes the benefits of these three choices since they have the ability to create:

- more employment because of the use new technology,
- more competitiveness because of policy resilience and energy savings,
- sustainable economic growth (by attracting new production processes), both for the port and the local and national economy.

In the following tables (Tables 3-5), the objectives, the roles of main actors and stakeholders, the activities and the implementation steps of each action are being presented in brief.

Information system for monitoring energy consumption – Energy management database

Regarding the Information system for monitoring energy consumption - Energy management database, it has been developed by IT professionals according to the actual ThPA user requirements. It will be a relational database built in a Unix server with a Node JS graphical user interface. The database will be installed in the ThPA servers and will be accessible only within the internal network of the company with users using the same credentials to log in the database they use to access ThPA's computer network.

There will be three user levels with different access and capabilities, namely Administrator, Editor and Viewer. The Administrator user level will be granted only to staff from the ThPA IT department. The administrator will be able to control the overall functionalities of the database from the backend, will be able to add/remove users and will be able to add/remove/modify the inserted data. The Editor user level will be granted by the administrator to other ThPA staff who will be dedicated to inserting and modifying the data

into the database whereas the Viewer user level will be granted to anyone in ThPA who needs to access, view and download but not modify the data for further processing and use.

The database will have a plain and user-friendly graphic user interface and environment with simple graphics and “clear” operations. The data stored will include Electricity, Natural Gas and Liquid Fuels consumption amounts with the respective costs and metrics included in the printed bills sent by the energy companies. The database will have the following additional to energy consumption functionalities. It will enable the ThPA Editor users to store water consumption and costs data, generated waste types, quantities and costs data and it will be able to automatically calculate the CO₂ emissions using state of the art emission factors. These functionalities will upgrade the database into an Environmental management tool.

Finally, the database will be able to store the original bills in pdf format for cross validation of logged data and will allow all user levels to export the selected data in csv, xls, pdf formats as well as graphs in jpeg image format. The database will be designed in such a way so that it will be interoperable, upgradable and ready to accept new data flows.

Table 3: Information system / database for monitoring energy consumption

OBJECTIVES	<ul style="list-style-type: none"> • To record, assess and monitor the consumption of electricity, natural gas, and liquid fuels in all port activities and operations. In addition water and waste quantities can be monitored. • Support ThPA towards monitoring its energy consumption. • To help the transition to a low carbon economy.
ROLE OF MAIN ACTORS AND STAKEHOLDERS	<ul style="list-style-type: none"> • Environmental awareness. • Acknowledgement of the systems content and significance. • Cooperation with ThPA in applying its sustainability plan.
ACTIVITIES	<ul style="list-style-type: none"> • Prompt filling in of the database content. • Assessment of the system data and relevant reports.
TIMING	<ul style="list-style-type: none"> • The system will be set into trial operation by the beginning of 2020.
IMPLEMENTATION STEPS	<ul style="list-style-type: none"> • Development of the system. • Training of port staff for using the database. • Pilot testing and assessment. • Formal operation.

Transport study - Truck flow management

The scope of the transport study is to propose a new truck flow management for the Conventional Cargo Terminal of ThPA with a view to enhance traffic safety, minimize the level of congestion, reduce truck route length and truck idle time, reduce the CO₂ and other Greenhouse Gas emissions and lower the level of fugitive dust production by better organizing and designing truck routes, establishing new buffer zones and parking spaces, and addressing truck and railway conflicts. All the above will increase efficiency in the Conventional Cargo port and will provide better port services. The study presents the developed methodology and the current situation regarding the truck flows in the Conventional Cargo Terminal. It gives a fair presentation of the proposed measures and scenarios, and concludes with the assessment of the proposed solutions. Two

types of solution scenarios are included and tested in the study: Scenario 1: Truck flow management using current infrastructure, and Scenario 2: Truck flow management with the introduction of new infrastructure.

Table 4: Transportation study - Truck flow management system

OBJECTIVES	<ul style="list-style-type: none"> • Improve truck flow management towards minimizing port's environmental impacts and increase efficiency • Enhance traffic safety • Minimize the level of congestion in the port • Reduce truck route length and truck idle time
ROLE OF MAIN ACTORS AND STAKEHOLDERS	<ul style="list-style-type: none"> • Follow port's new trucks routes (drivers) • Environmental awareness (drivers) • Truck flow supervising and control (ThPA)
ACTIVITIES	<ul style="list-style-type: none"> • Development and proposal of updated and new trucks' routes, stops, parking and operation areas
TIMING	<ul style="list-style-type: none"> • Finalization of the study until September 2019. • Application of the study after decision from the Management
IMPLEMENTATION STEPS	<ul style="list-style-type: none"> • Study finalization. • Informing ThPA staff. • Informing truck drivers and related transport companies. • Pilot testing and assessment. • Formal application of the study.

Energy management plan

The energy management plan will initially provide an overview of the current energy management practices at the Port of Thessaloniki following a well-defined methodology provided by another EU project. Moreover, the scope and responsibilities of the energy management plan are defined. The established Energy management plans of other ports are reviewed, with regard to their policy and technologies implemented. In addition, legal frameworks governing energy efficiency and management from international and national perspectives are presented. Moreover, the energy efficiency and resource consumption associated with its activities are identified and measures to minimize impacts. In this context, the energy objectives and targets are determined and an overview of the energy needs and potential solutions and technologies that will address these needs is provided.

Table 5: Energy management plan

OBJECTIVES	<ul style="list-style-type: none"> • To assess the energy consumption in all port activities and propose relevant improving actions. • Support ThPA towards reducing its energy consumption and energy footprint • To enable the transition to a low carbon economy.
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ROLE OF MAIN ACTORS AND STAKEHOLDERS	<ul style="list-style-type: none"> • Facilitate plan's drawing up (ThPA staff and port users) • Environmental awareness (port users) • Approve proposed investments (ThPA Management) • Support improving actions implementation (ThPA staff)
ACTIVITIES	<ul style="list-style-type: none"> • Development and proposal of selected interventions regarding energy consumption.
TIMING	<ul style="list-style-type: none"> • Finalization of the plan until September 2019.
IMPLEMENTATION STEPS	<ul style="list-style-type: none"> • Plan finalization. • ThPA staff informing. • Port users informing. • Gradual implementation of improving actions.

6 Actions and solutions deployment

Since the current Action plan for a sustainable low carbon port of Thessaloniki does not foresee any specific pilot action, this section will describe and discuss the way the actual implementation of the selected actions is expected to be carried out. Furthermore, during the preparation of this Action Plan, none of the proposed actions (truck flow management, energy management plan, and Information system for monitoring energy consumption) has been applied. Thus, there are no data from tests or other real situations. Based on the above, the steps for actions successful deployment in the future are identified below.

6.1 Information system for monitoring energy consumption

Step 1: Development of the database. The development of the database is being conducted by an external IT expert company. The full development of the database has been finalized at the end of November 2019. This step also includes the systems quality testing and functioning prior to installation.

Step 2: Installation of the database in the IT infrastructure of ThPA. After the termination of the database development and functional testing, the database will be installed in the IT infrastructure of ThPA under the supervision and guidance of ThPA IT department.

Step 3: User assigning. At this stage the IT department in coordination with the company's management will decide which employees will be assigned the Administrator, Editor and Viewer user status. This will be largely influenced by the existing role that the employees have in the company. ThPA's top management are among the users to be assigned.

Step 4: Training of assigned port staff for using the database. At this step the ThPA's IT department will internally train, during a relevant training session, the assigned staff in using the database. For this scope a user manual has been developed in the Greek and English language. The user manual is embedded in the database in order to be accessible to anyone that might need it.

Step 5: Pilot testing and assessment. Upon the finalization of the system and the providing of relevant information to port staff and users about its structure and operation, the system will be tested by using real data.

Step 6: Formal operation. The database is fully operational.

Step 7: Disseminating results: The results of the system's application and operation will be well communicated internally among ThPA staff and top management. After a top management decision, selected results may be published in ThPA's website.

6.2 Truck flow management

Step 1: Study finalization. The study was is expected to be finalized by the end of November 2019.

Step 2: Informing ThPA conventional cargo staff. After the approval of the study from the ThPA top management, the study with its proposals and truck flow scenarios will be communicated to the conventional cargo related staff of ThPA. This will take place in an internal training session.

Step 3: Informing truck drivers and related transport companies. After informing ThPA staff, the study proposals and truck flow scenarios will be communicated to the truck drivers and related transport companies. This is a very crucial step for the study implementation since the effectivity of the proposed measures and scenarios largely depend on the willingness of these port users to apply them. The role of ThPA to impose those measures is very important in this step too.

Step 4: Testing of the proposed measures. The measures proposed by the truck flow management study will be tested for their real world effectivity in this step. Potential drawbacks will be identified.

Step 5: Formal application of the study. At this step the study will be formally applied in the Conventional cargo port.

6.3 Energy management plan

Step 1: Plan finalization. The energy management plan was finalized at the end of November 2019. After the finalization the plan will be forwarded to the ThPA top management for official approval.

Step 2: ThPA staff and port users informing. Following the approval of the plan from the ThPA top management, a training session will be organized for all competent port staff and selected users in order to explain, communicate and facilitate the understanding of its structure, content, timing and the foreseen actions of the plan.

Step 3: Gradual implementation of proposed interventions. At this step, the proposed interventions will be gradually implemented depending on annual budget decisions and the technical capacity of the company.

7 Coordination with relevant plans

The proposed actions of ThPA SA address specific sustainability issues, focusing particularly in the achievement of the following targets:

- Keep the emissions of specific air pollutants (SO_x, NO_x, CO₂, PM₁₀, PM_{2.5}) under the specified by the legislation limits.
- Reduce systematically the port's carbon footprint.
- Keep the noise levels within the port area under the specified by the legislation limits.
- Achieve zero incident at port staff and users due to truck flows and other technical equipment within port area.
- Improve the accessibility and mobility of trucks entering the port area.
- Improve port's energy efficiency.

Based on the above and considering the overall strategies at various territorial levels (local – e.g. SUMPs, regional, national, EU) and interdependent sectors (e.g. SEAPs, SECAPs, etc), it is ensured that the proposed actions are linked and coherent with them.

7.1 National Port Policy

The current National Port Policy is in force from 2013 and among its objectives are the improvement of the ports' link with the land transport means, the upgrading of their services, as well as the enhancement of their environmental management and energy efficiency. Thus, it is well understood that ports' specific actions are in close link with the provisions of the national policy, especially in terms of environmental and energy improvements.

7.2 National Transport Plan for Greece

In response to the need for a more comprehensive overview of the Greek transport sector, the Hellenic Ministry of Infrastructure and Transport commenced in 2015 an operation to develop a National Transport Plan (NTP) for Greece. The Plan provides the basis for sustainable transport infrastructure and service development in Greece over the medium (2027) to long-term horizon (2037), aiming at, but not limited to, fostering the competitiveness and sustainability of the transport sector of the country and identifying solutions that would cover also organisational and institutional interventions that would complement the envisaged investment also in transport infrastructure. Two of its nine pillars have as objective to “Enhance Safety, Sustainability, Efficiency and Competitiveness of Transport” and “Improve the operating efficiency of the Logistics Sector through effective regulation, business incentives and consolidation”. Furthermore, NTP has set the following, among others, performance indicators: (a) reduction of 17.5% in the cost of environmental impacts of transport and (b) reduction of 12% in number of road accidents and 11.6% in number of fatalities. Both these targets are linked with the ones of ThPA SA's proposed targets, which aim to mitigate environmental impacts and improve road safety.

7.3 National Energy and Climate Plan

The primary objective of the Greek energy policy is to ensure the viable and sustainable development of the energy sector from production to end use, also protecting the environment and making a contribution towards addressing climate change. Improving energy efficiency in all fields of consumption is the biggest endeavour and challenge for the public policies to be implemented in the next decade. Therefore, it is an absolute and horizontal priority that should cover the entire scope and mix of policies and measures to be adopted. Energy savings achieved through improved energy efficiency have a directly impact on how energy

is consumed, on the technologies used and on the coverage of consumer energy needs, also making a substantial contribution towards improving the competitiveness of all industrial activities. The national energy and environmental objectives for the 2021-2030 period in the context of EU policies are: (a) Reduce greenhouse gas emissions, (b) Increase the share of RES in energy consumption and (c) Achieve energy savings in final consumption. All three of the previous goals are linked with the specific actions and aims of ThPA SA towards enhancing its energy efficiency.

7.4 Thessaloniki Sustainable Urban Mobility Plan (SUMP)

Through involving all key stakeholders, the Thessaloniki Public Transport Authority (ThePTA) implemented a SUMP for the entire metropolitan area focused on public transport. The Thessaloniki SUMP is now an example for other cities in Greece and other countries in south-eastern Europe that face similar challenges. The final SUMP consists of 12 measures to be implemented and monitored, and enhancements to the SUMP methodology, including the development of transport modes in an integrated manner, integrated quality of travel behaviour and specific attention to environmental issues. ThPA SA's proposed actions are not in conflict with the above priorities, given also the positive "response" on port's plans of the Municipality during the SUPAIR focus group meeting in Thessaloniki.

7.5 Municipality of Ampelokipi - Menemeni Sustainable Urban Mobility Plan (SUMP)

The SUMP of the Municipality of Ampelokipi – Menemeni is currently under finalization having as main aim the development of a modern transport planning approach: a) Promoting MMS and alternative mobility, b) Holistic view of traffic, urban planning, environmental and socio-economic parameters, c) Co-operation and co-ordination of stakeholders; d) infrastructure, e) Exploitation of new technologies and innovation; f) Adaptation to the specific conditions of the region. As in the case of the SUMP of the Municipality of Thessaloniki, ThPA SA's proposed actions are in line with the above priorities.

8 Assessment design

The three proposed actions of the current Action Plan have direct links with sustainability issues such as air quality, Energy consumption, noise, safety incidents as well as accessibility and mobility. Relevant training – information campaigns will be organized. More particularly:

- Environmental awareness campaign for all action plans, for both port staff and users.
- Specific training seminars to port staff (information system on energy monitoring).
- Specific guidelines to port users (truck flow management, energy management plan).

The assessment method of all the proposed interventions is based on the following indicators as indicated in Section 4:

Table 6: Indicators for assessing proposed actions

Sustainability issue	Assessment method	Impact indicator
Air quality	Keep the emissions (SO _x , NO _x , CO ₂ , PM) under the specified by the legislation limits.	Concentration of SO _x , NO _x , CO ₂ , PM
Energy consumption	Reduce the carbon foot print by 5% in the next 2 years.	tCO ₂ /year, kWh per year
Noise	Keep the noise levels at port's perimeter under the specified by the legislation limits.	Level of dB(A)
Incidents	Zero incident at port staff and users due to truck flow within port area.	Incidents
Accessibility and mobility	Improve the accessibility and mobility of trucks entering the port area.	Engine operational time. Trucks waiting time.

9 Monitoring Plan

In general, environmental monitoring describes the processes and activities that need to take place to characterize and monitor the quality of the environment. Environmental monitoring is used in the preparation of environmental impact assessment reports, as well as in many circumstances in which human activities carry a risk of harmful effects on the natural environment. All monitoring strategies and programs have reasons and justifications which are often designed to establish the current environmental status of an area or to establish trends in environmental parameters. In all cases, the results of monitoring will be reviewed, analysed statistically, and published. The design of a monitoring program must therefore consider the final use of the data before monitoring starts.

Specifically and as stated in the previous chapter, in the case of the port of Thessaloniki, the monitoring plan will focus on the following environmental-sustainability issues:

- Air quality
- Energy consumption
- Noise
- Incidents
- Accessibility and mobility

The main objectives of the proposed Actions Monitoring Plan include:

- To provide a database from which the environmental impacts of the port can be assessed.
- To provide an early indication should any of the environmental control measures or practices fail to achieve the acceptable standards.
- To monitor the performance of the port environmental policy and sustainability, and effectiveness of the mitigation measures.
- To determine port compliance with regulatory requirements, standards and government policies.
- To take remedial actions if unexpected problems or unacceptable impacts arise.

The scope of the Monitoring Plan shall include:

- Record and assessment of the values of the identified indicators.
- Meetings with port staff and stakeholders.
- Identification of progress, gaps, failures, perspectives.
- Identification of improvement actions and plans.
- Publication of a relevant report.

For those reasons, environmental monitoring will include quantitative assessment of port's air quality, energy consumption, noise, incidents and accessibility and mobility.

The main goals of the EMP are:

- to limit the CO₂ and other air pollutants emissions
- to improve port's energy efficiency
- to control and manage other port environmental impacts (i.e. noise, incidents, traffic)

9.1 Record and assessment of the values of the identified indicators.

According to the specific sustainability issues set out in the Action Plan, the following table presents the relevant indicator, the way/method of recording and the type of assessment.

Environmental issue	Indicator	Recording method	Assessment
Air quality	Concentration of SO _x , NO _x , CO, PM10, PM2.5	<ul style="list-style-type: none"> • <i>PM10 & PM2.5</i> 24h measurements of µgr/m³ • <i>SO_x, NO_x, CO</i> 24h measurements in hourly level 	Comparison with the equivalent values specified in the competent Hellenic legislation.
Energy consumption	Amount of kWh per year, tCO ₂ /year.	Calculation of the value of the indicator according to the Guidance Document and Tool of the World Ports Climate Initiative (WPCI).	Yearly comparative review. Identification of main areas where further energy efficiency improvements can be realized in the port.
Noise	Level of dB(A).	Measurement of noise level at port's specific locations according to Lnight[dB(A)] and LDEN[dB(A)] parameters.	Comparison with the equivalent values specified in the competent Hellenic legislation.
Incidents	Number of incidents.	Full record of all incidents/accidents happened at port staff and users due to truck flow within port area, at annual/location basis.	Comparison of the number of incidents in a yearly level (timeseries). Identification of areas for improvement.
Accessibility and mobility	Engine operational time and trucks waiting time, before and after the proposed management plan.	Estimation of the engine operational time and trucks waiting time, before and after the proposed management plan, at annual/location basis.	Comparison of the value of relevant times in a yearly/location level (timeseries). Identification of areas for improvement.

9.2 Meetings with port staff and stakeholders.

Stakeholder pressure regarding environmental issues has been growing since the early '50s, forcing organisations to undertake specific actions, that under other circumstances they would not do. Therefore, it is believed that stakeholder management can play a significant role in enabling organisations to manage present and future environmental issues and demands, based on increasing environmental legislation driving corporate responsibility.

Almost all ports also experience such stakeholder pressure in their activities and try to manage it in their own terms. Clearly explaining the monitoring plan to port employees and relevant stakeholders is vital. The more involved the staff are, the more committed they will be - making it easier to operate the plan effectively. Although ThPA SA keeps all staff up to date, some employees may need more information about environmental issues than others. This depends on the area they work in and how much responsibility they have.

For ThPA SA it is essential:

- to communicate clearly how the monitoring plan affects departments and individuals
- that senior management continues to show commitment
- to ensure that employees are given the necessary training whenever their role changes

To ensure effective internal communication, ThPA SA will:

- inform employees in advance about the monitoring plan and encourage them to start thinking about the part they can play
- keep employees updated throughout the process – e.g. by using an environmental noticeboard, internal emails or memos, meetings or team briefings
- ask employees for their ideas
- be open – provide both good and bad feedback
- make sure employees understand and see the value of the monitoring plan
- set up frequent environmental management team meetings

Stakeholders form part of port's monitoring plan in general and should be given a copy of ThPA SA environmental policy. Furthermore, ThPA SA should also make contractors aware of the monitoring plan at its site.

If the stakeholders' duties require a higher degree of awareness, ThPA SA will provide a stakeholder training session. This may include a short introduction to business procedures and requirements, and a presentation highlighting specific environmental issues on site.

Additionally, ThPA SA will provide information about the monitoring plan to external stakeholders by providing information on its business website and in an environmental report.

9.3 Identification of progress, gaps, failures, perspectives.

The aim of this identification is to regularly assess whether:

- Port's monitoring plan is operating according to the agreed policies, targets and procedures
- Port is conforming to planned arrangements and legal requirements
- Port is conforming to its specific requirements of ISO 14001
- Defined objectives and targets are being met
- There are perspectives for improvement

The key areas to assess during the environmental audit include:

- compliance with procedures
- compliance with policy
- compliance with objectives and targets
- areas of lack of control or unacceptable risk
- staff and stakeholder behaviour and performance
- adequacy of communications
- whether there are any new potential environmental risks

It is essential that enough resources to carry out this type of identification are made available by ThPA SA. The progress, gaps, failures and perspectives identified must be registered, reviewed and assessed.

9.4 Identification of improvement actions and plans.

Any actions should be implemented according to a specified programme. In some cases, action will need to be taken immediately (e.g. where a lapse in procedures has led to possible noncompliance with legislative requirements).

No monitoring plan is perfect. ThPA SA may probably identify problems (including nonconformities) during the performance of the monitoring plan, thus it should identify root causes, as well as corrective and preventive actions and plans. In addition, it will track those actions and plans and verify their effectiveness.

Plan's nonconformities and deficiencies (such as legal noncompliance) should be analyzed to detect patterns or trends. Identifying trends, will allow ThPA SA to anticipate and prevent future problems.

Preventing problems is generally cheaper than fixing them after they occur (or after they reoccur).

The effort for planning and documentation needed for corrective & preventive actions will vary with the severity of the problem and its potential environmental impacts.

Once ThPA SA documents a problem, the Authority must be committed to resolve it in a timely manner. Port will make sure that any corrective & preventive action/plan process specifies responsibilities and schedules for completion and review.

Corrective actions and plans will (1) resolve the immediate problem, (2) consider whether the same or similar problems exist elsewhere in the port, and (3) prevent the problem from recurring. The corrective action process also will define the responsibilities and schedules associated with these three steps.

It should be mentioned that over the long run, many problems and good ideas may be identified by the people doing the work. This will be encouraged through port staff and stakeholders' engagement.

9.5 Publication of a relevant report.

The ThPA SA is committed to providing prompt and transparent disclosure, seeking to build long-term trust of its stakeholders while achieving sustainable growth that complements society. ThPA SA will advance its Corporate Responsibility activities by establishing lasting relationships with its stakeholders through appropriate disclosure, reporting, and dialogue.

More specifically, environmental information on the monitoring plan shall be presented in a clear and coherent manner in electronic or printed form, through a relevant report. The report shall contain elements such as:

- a. a description of the port and a summary of its main activities
- b. the environmental policy and a brief description of the environmental monitoring plan
- c. a summary of the data available on the performance of the port against its specific environmental objectives and targets (reporting shall be on the core indicators of the monitoring plan)
- d. a reference to the applicable legal requirements relating to the environment.