D 3.2.3 Territorial needs assessment

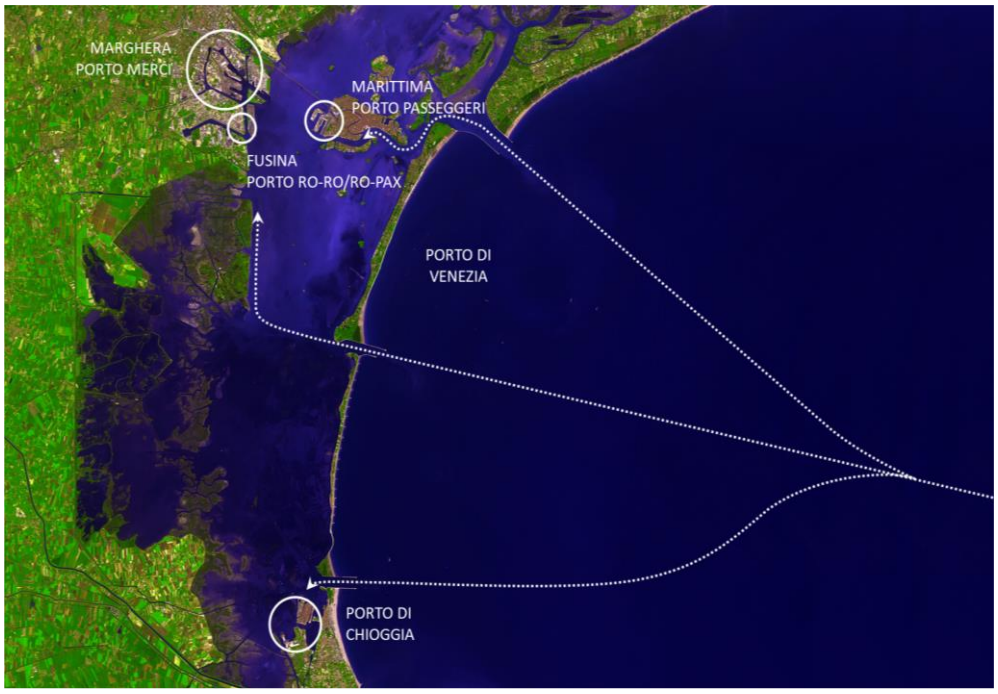
Port of Venice

Sommario

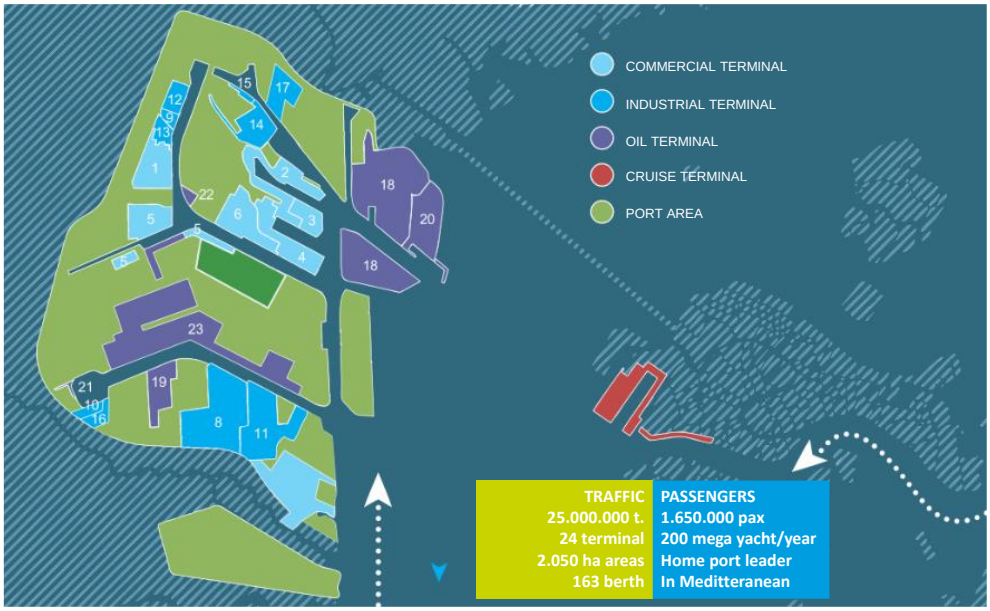
Section A – Territorial analysis

Subsection A.1 – Geographical description

The Port of Venice represent one of the most important port and logistics systems in the Adriatic. Due to its strategic position, it represents an increasingly strong link in the logistics chain between Central and Eastern Europe on one side as well as the East Mediterranean, the Middle East and the Far East on the other side.



The Port of Venice is also the northernmost terminal of the Motorways of the Sea that cross the Eastern Mediterranean and connect Central Europe with North Africa and the Middle East. The Port of Venice is one of the major European ports for project and general cargo, and one of the main ports in the Adriatic for the number of containers handled. A leader in many traffic segments, it is the only port in Italy to benefit from a river port providing freight transport by barge along the Po river.



Given its the location, the Port of Venice, plays a relevant role as a gateway and logistics service provider to the North of Italy and more specifically the Eastern Lombardy, and other international destinations, such as Central and Eastern Europe (e.g. Southern Germany, Austria, Switzerland, etc).

Sub-section A.2 Multimodal transport: supply and demand analysis

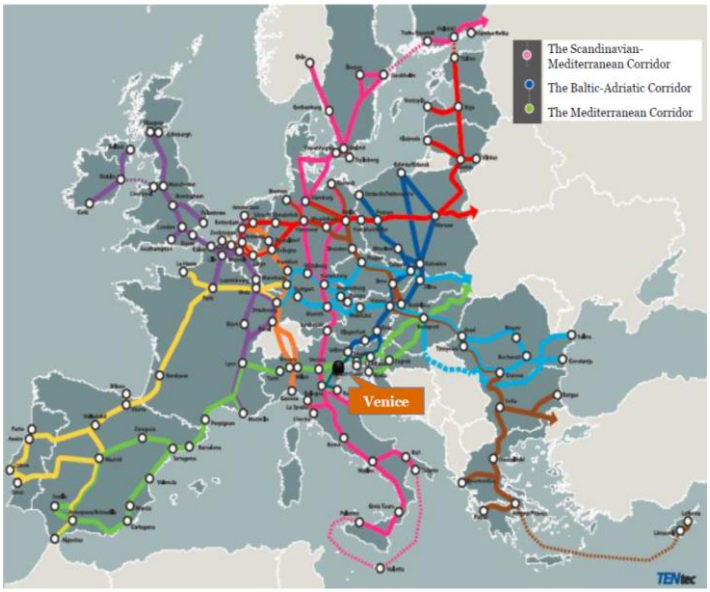
The role of the Port of Venice as key interconnection node of transport flows between the South-Eastern countries and the Central-North countries is recognized by the inclusion of the port in the list of "Core seaports" of the new TEN-T Regulation (EU Regulation n. 1315/2013).

The Port is a crossroads of three out of the nine multimodal TEN-T Core Network Corridors:

- the **Mediterranean Corridor**, that links the Iberian Peninsula with the Hungarian-Ukrainian border, including also the Po river and other inland waterways in Northern Italy; it allows the connection of Venice with the North of Italy and with the Balkans;

- the **Scandinavian-Mediterranean Corridor**, that is connected with the previous corridor in Verona allowing the flows of goods and passengers towards Germany and Scandinavian countries;

- the **Baltic-Adriatic Corridor** that connects the Baltic and the Adriatic Sea, linking Venice with the Central Eastern European countries.



The port has been also considered as "core inland port" in the TEN-T core network.

The Port of Venice is defined by the EU Regulation n. 913/2010 as a node of the:

- **Freight Corridor n.5** (Gdynia-Katowice-Ostrava/Žilina-Bratislava/Vienna/Klagenfurt-Udine-Venice/Trieste/Bologna/Ravenna/ Graz-Maribor-Ljubljana-Koper/Trieste).

- **Freight Corridors n. 6** (Almería-Valencia/Madrid-Zaragoza/Barcelona-Marseille-Lyon-Turin-Milan-Verona-Padua/Venice/ Trieste/Koper- Ljubljana-Budapest-Zahony.

Road connections

The Port of Venice has immediate road access from the port to the strategic road network (A4/E70 motorway).The A4 provides access to the east towards Friuli-Venezia-Giulia and west to Verona and Lombardia, while the A13 provides access towards Rovigo and Bologna to the southeast.

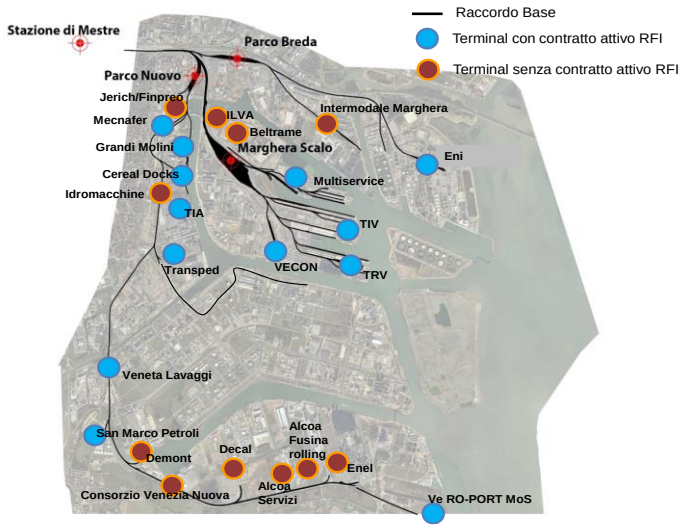
Railway connection

The Venezia-Marghera Railway District, as defined by Decree 3/2017 of North Adriatic Sea Port Authority, has a total length of about 65 km and consists essentially of:

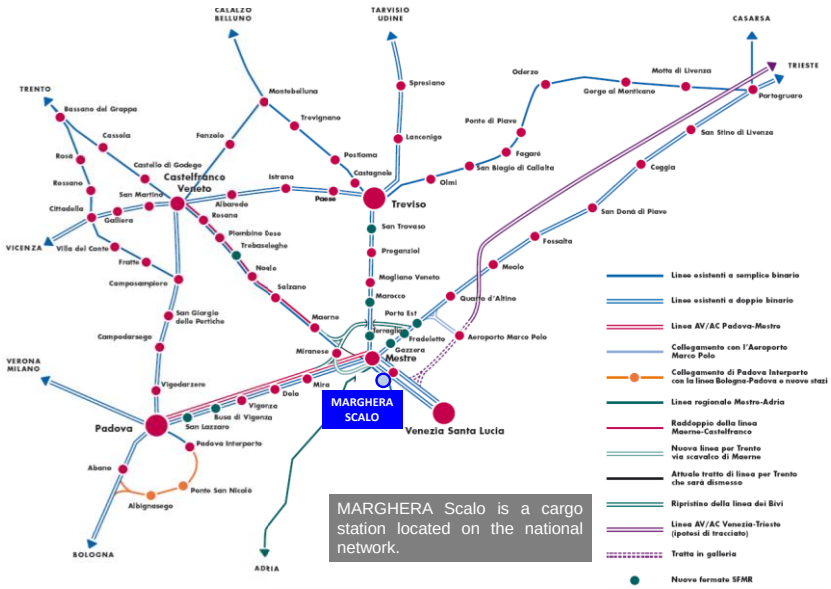
- the national freight station of Venezia Marghera Scalo (with its exchange track and reception and departure siding);
- the fan of sidings of Parco Breda (serving the northeast port area);
- the fan of sidings of Parco Nuovo (serving the southwest port area);
- Raccordo Base, branching from the station of Venezia-Mestre up to single gate of linked terminals;
- railway sidings, with tracks and sidings, within each area of the port.

Both Terminals (4) and Industries (12) operating in Venezia Marghera Scalo Railway District (Table 1) receive and send goods by railway through the Railway Siding Main Line operated by Esercizio Raccordi Ferroviari (ERF): freight trains arrived in Venezia Marghera Scalo Railway Station are delivered to them by Esercizio Raccordi Ferroviari di Porto Marghera S.p.a. as Single Shunting Operator and viceversa.

Table 1 - Venezia Marghera Scalo Railway District – Operating Terminals and Industries



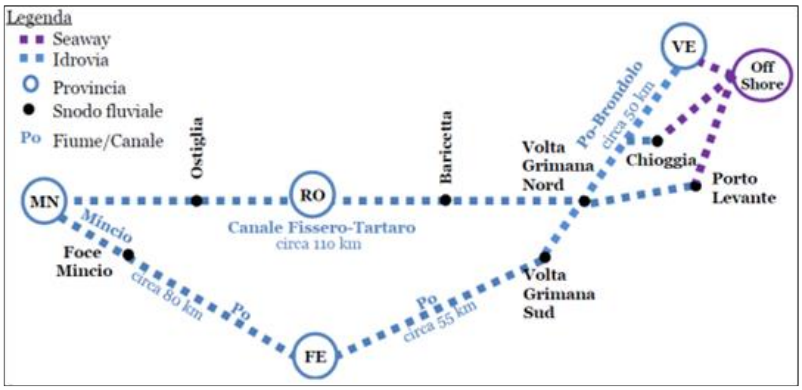
Venezia Marghera Scalo Railway Station is part of the national railway infrastructure manged by RFI as the National Infrastructure Manager and it is used only for freight traffic. It consists of a Main Marshalling Yard of 12 railway tracks, where trains arrive and depart and convoys of railway vehicles are given to and taken by Railway operators.



MARGHERA Scalo is a cargo station located on the national network.

Inland connection

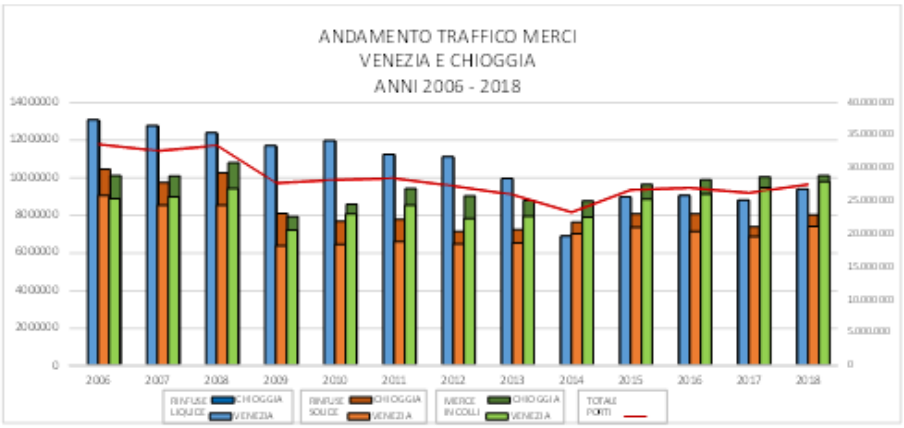
The river network Padano-Veneto is an important alternative to reach the markets of origin/destination centre north (Lombardia and west Veneto areas). The river system is an alternative to the road network infrastructure that is currently being used to serve the areas of origin/destination of the goods in view of the excellent road accessibility of the port of Venice, directly connected to the main roadways of the northeast. The inland waterways connections, the Idrovia Padano – Veneta, has been included in the TEN-T network and it is part of multimodal Mediterranean Corridor. The main ports of this "network" are Venice, Chioggia, Porto Levante and Mantova.



The traffic throughput in the Port of Venice and modal split

The following paragraph reports, amongst others, an extract of an in-depth study, commissioned to - and conducted by the Rail Shunting Company of Venezia-Marghera Railway District, Esercizi Raccordi Ferroviari (ERF), within the PROMARES project. The study was oriented to depict the current scenario of the traffics in the Venezia Maghera Scalo Railway District as well as the future scenarios, that will be reported in the following paragraph.

In 2018 the total throughput of Port of Venice and Chioggia was about 27,5 million tons.



The port's hinterland for container traffic mainly covers the North of Italy - principally the Veneto, but also the Lombardia and Emilia Romagna regions - and so is dominated by road haulage for inland distribution. The North Adriatic Sea Port Authority provides concessions to private sector terminal operators and has two container terminals; Vecon is a dedicated container terminal with ship-to-shore container cranes operated by PSA, while TIV is a container terminal using harbour cranes which has MSC as its main customer. The port has a single deep sea container service, operating ships of about 6,100 TEU, which call partially laden at the port because of draft restrictions. The port also has two feeder links with Trieste and receives calls from a range of other feeder and short sea services.
In line with the prescriptions included in the National Plan for Ports and Logistic, the Port of Venice is carrying on a series of investments aiming at improving its railway infrastructures and easing the port's railway accessibility services with the aim to increase its multimodality. Actually, the road modality is predominant respect to the others, even if recently the rail transport has registered a constant growth.
During 2018 the railway traffic generated by the Port of Venice was about 5.543 train equal to 2.6 million tons of freight moved (about 100 trains/week). In the 2018 train traffic has shown a growth of 13% in respect to 2017. The constant traffic growth of the last 6 years lead to suppose that the trend is structural (see following table 1).

	2012	2013	2014	2015	2016	2017	2018
Trains/year	4.001	4.921	3.917	4.331	4.821	5.441	5.543
wagons/year	62.000	81.000	71.000	72.000	89.000	90.521	100.754

Table 1 –Traffic in Railway District of Port of Venice. Source: AdSPMAS.

The main freight categories handled are: steel products (54% of total freight), energy products (17%), agrifood products (15%), chemical products (7%) and ro-ro/containers (6%).
The tables below show trends for 2012-2019 nine-year period for different kind of products in tons (Table 2) and growth trends with respect to the previous year in tons (Table 3) both for departed and arrived goods.

Table 2 – Freight traffic in Venezia Maghera Scalo Railway District (2012-2019)

Merce in partenza dal Porto di Venezia via ferro [t]

Prodotti	2012	2013	2014	2015	2016	2017	2018	2019
Prodotti siderurgici	908.607	1.149.317	952.460	952.646	1.128.912	1.244.902	1.395.305	1.106.271
Prodotti energetici	180.986	95.605	63.110	164.913	245.639	232.107	220.642	242.794
Prodotti agroalimentari	222.508	271.835	241.761	197.950	323.054	286.340	287.340	204.757
Prodotti chimici	78.360	105.105	105.878	103.260	101.708	108.027	105.173	105.403
Containers/Semirimorchi	8.744	12.356	56.092	60.462	86.608	82.021	72.021	54.256
Merce varia	0	19.085	28.798	4.437	7.341	6.697	8.167	989
Totale	**1.399.205**	**1.653.304**	**1.448.099**	**1.483.668**	**1.893.262**	**1.960.094**	**2.088.648**	**1.714.470**

Merce in arrivo al Porto di Venezia via ferro [t]

Prodotti	2012	2013	2014	2015	2016	2017	2018	2019
Prodotti siderurgici	4.724	170.429	7.928	66.304	9.816	21.954	14.749	63.146
Prodotti energetici	0	34.314	69.118	106.065	149.377	166.404	238.389	121.815
Prodotti agroalimentari	51.963	45.397	81.578	49.461	64.386	68.140	102.247	98.571
Prodotti chimici	20.567	32.391	46.909	53.673	58.214	57.358	57.133	65.918
Containers/Semirimorchi	24.554	12.304	3.476	26.465	62.740	45.862	45.983	47.543
Merce varia	775	6.429	5.727	1.730	0	13.339	49.655	32.885
Totale	**102.583**	**301.263**	**214.736**	**303.698**	**344.533**	**373.057**	**508.156**	**429.878**

Merce movimentata via ferro al Porto di Venezia [t]

Prodotti	2012	2013	2014	2015	2016	2017	2018	2019
Prodotti siderurgici	913.331	1.319.746	960.388	1.018.950	1.138.728	1.266.856	1.410.054	1.169.417
Prodotti energetici	180.986	129.919	132.228	270.978	395.016	398.511	459.031	364.609
Prodotti agroalimentari	274.471	317.232	323.339	247.411	387.440	354.480	389.587	303.328
Prodotti chimici	98.927	137.496	152.786	156.933	159.922	165.385	162.306	171.321
Containers/Semirimorchi	33.298	24.660	59.568	86.927	149.348	127.883	118.004	101.799
Merce varia	775	25.515	34.526	6.167	7.341	20.036	57.822	33.874
Totale	**1.501.788**	**1.954.567**	**1.662.836**	**1.787.366**	**2.237.795**	**2.333.151**	**2.596.804**	**2.144.348**

Table 3 – Growth trends for freight traffic in Venezia Maghera Scalo Railway District (2013-2019)

Merce in partenza [t]

Prodotti	Tasso 2013	Tasso 2014	Tasso 2015	Tasso 2016	Tasso 2017	Tasso 2018	Tasso 2019
Prodotti siderurgici	26%	-17%	0%	19%	10%	12%	-21%
Prodotti energetici	-47%	-34%	161%	49%	-6%	-5%	10%
Prodotti agroalimentari	22%	-11%	-18%	63%	-11%	0%	-29%
Prodotti chimici	34%	1%	-2%	-2%	6%	-3%	0%
Containers/Semirimorchi	41%	354%	8%	43%	-5%	-12%	-25%
Merce varia	n.a.	51%	-85%	65%	-9%	22%	-88%
Totale	**18%**	**-12%**	**2%**	**28%**	4%	7%	**-18%**

Merce in arrivo [t]

Prodotti	Tasso 2013	Tasso 2014	Tasso 2015	Tasso 2016	Tasso 2017	Tasso 2018	Tasso 2019
Prodotti siderurgici	3508%	-95%	736%	-85%	124%	-33%	328%
Prodotti energetici	n.a.	101%	53%	41%	11%	43%	-49%
Prodotti agroalimentari	-13%	80%	-39%	30%	6%	50%	-4%
Prodotti chimici	57%	45%	14%	8%	-1%	0%	15%
Containers/Semirimorchi	-50%	-72%	661%	137%	-27%	0%	3%
Merce varia	730%	-11%	-70%	-100%	n.a.	272%	-34%
Totale	**41%**	**58%**	**23%**	**13%**	**8%**	**36%**	**-15%**

Merce movimentata [t]

Prodotti	Tasso 2013	Tasso 2014	Tasso 2015	Tasso 2016	Tasso 2017	Tasso 2018	Tasso 2019
Prodotti siderurgici	44%	-27%	6%	12%	11%	11%	-17%
Prodotti energetici	-28%	2%	105%	46%	1%	15%	-21%
Prodotti agroalimentari	16%	2%	-23%	57%	-9%	10%	-22%
Prodotti chimici	39%	11%	3%	2%	3%	-2%	6%
Containers/Semirimorchi	-26%	142%	46%	72%	-14%	-8%	-14%
Merce varia	3192%	35%	-82%	19%	173%	189%	-41%
Totale	**30%**	**-15%**	**7%**	**25%**	4%	11%	**-17%**

At 2030, considering the full operability of Montesyndial new container terminal, it is reasonable to foresee that freight moved by train will be about of 3.2 million tons. equal to 9.700 train/year.

In order to catch these new market opportunities, the Port of Venice is planning a series of new investments aiming at optimising the rail operability within the port as reported in the following paragraph.

Section B – Future scenarios

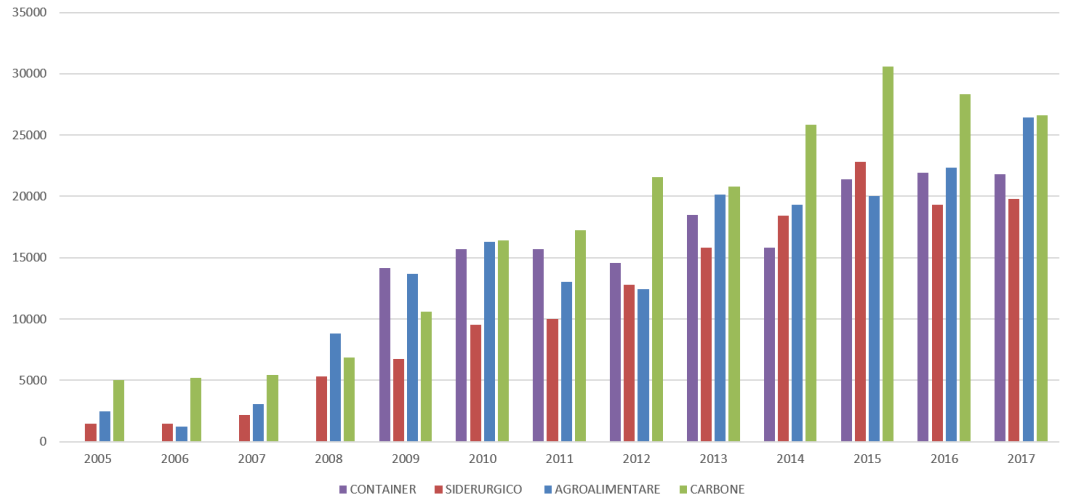
The shipping business is a very competitive business with low (and declining) margins. As such, shipping lines are strongly focused on cost-efficiency of their services. The cost-efficiency of shipping lines is positively affected by the following factors:

- the use of larger (and wider) vessels (economies of scale)
- the reduction of turn-around time in ports (time efficiency);
- increased cooperation between shipping lines due to lower freight rates and selection of efficient ports and reduced number of port calls.

Next to the main global trend of attaining economies of scale by increasing vessel sizes, a second major development is the focus on reducing the idle time of vessels. In order to reduce the idle time of vessels, the total turn-around time of the vessel need to be improved. The turn-around time of a vessel depends on three factors: time at anchorage, towage (in and out of the port) and time at berth.

These shipping trends could represent a challenge for the Port of Venice due to the impact that the new vessels dimensions could have on the port's infrastructures and on its efficiency.

The chart below shows the evolution of size of vessel that called the Port of Venice during the years.



In order to respond to these new logistic needs and improve its multimodal terminal efficiency, the port of Venice has planned a series of investments aiming at upgrading the existing port infrastructures in order to increase its logistic and multimodal efficiency.

With reference to the multimodal transport, the Port of Venice has planned a several investments with the scope of increase its railway traffic capacity. In particular, these investments are focused on:

1. **railway infrastructure improvements**
2. enhancement of railway **telematics systems for shunting operations** (SIMA) and its integration with PCS and information systems of other subject involved in developing rail services.

The railway infrastructure improvements

The Port of Venice has planned, with Railway National Infrastructure Manager (RFI), a series of new investments aiming at optimizing rail operations within the port rail network and last mile connections. The investments foresee to improve the shunting network with new tracks to directly connect the south-west backbone of the port and new terminal of Montesyndial with the Venezia Marghera Scalo station and doubling some part of the existing line.
These investments are part of NASPA's strategy aiming at improving the port infrastructures and enhancing the railway accessibility services as indicated in the National Strategic Plan for Ports and Logistic and stated in the Port Operational Programme 2018-2020.

The upgrade of the port rail network and last mile connections will allow to:

- eliminate to interfere with Mestre railway station in shunting phase;
- improve both the capacity and the safety of port railway system;
- reduced drastically the number of interferences between road and rail network within the port area;
- reduce drastically the rail shunting time in the southwest area of the port in which is generated about the 40% of the total rail traffic of the port.

A feasibility study preliminary to the realisation of the mentioned investment is enclosed to the present documents, proposing different modalities by which the infrastructure could be build up, comparing different solutions as well as outlining the best and more efficient one.

Telematics Systems for Shunting Operations (SIMA)

The SIMA IT system retrieves, processes and stores data during the manoeuvring procedures and the wagons positioning operations inside a port area or a railway hub, aiming to support management and real time monitoring of the operations. SIMA comprehends the following functional modules:

- manoeuvres Management;
- manoeuvres Monitoring;
- reporting;
- -account management;
- mobile and GPS infrastructure.

SIMA offers the following macro-functionalities:

- data acquisition, i.e. during the start-up phases of the manoeuvring procedures, through the insertion of the annual, weekly or daily schedules of the single manoeuvres, by entering data from the user interface;
- data processing, through application of rules, constraints and suggestions for the benefit of the various users of the system (Business Logic);
- notification of the status change of a procedure, through certified (timestamps based) and traceable communications;
- data archiving and database query functionality, through facilities such as affinity search or recent history;
- system log recording for tracking all events and who did what;
- automatic interface with GPS-EGNOS satellite tracking system, installed in locomotives;
- representation, through a synoptic table, of the entire railway park area with real time monitoring of:
  - tracks and relative occupation status;
  - locomotives (pushing or pulling) together with wagons, tugs and trains, each with its state (to be unloaded, repaired, departing, etc.);
  - recent, in progress or imminent operations.

Actually, SIMA does not fully meet the operational management needs. The most critical aspects concern above all the non-intuitive graphic interfaces, the absence of wizards, the absence of some useful correlations between the different modules of the system and the presence of unused data and functions. In addition to the critical issues on the use of the system, there is also the need to update the technologies used for development.
It is also necessary to introduce a component with process optimization and decision support functions that, through the processing of time series of data stored by the system and data received in real time, give indications on the most effective solutions to process management problems.

The system architecture, to date based on the restful model, will have to be updated to more effective models such as micro services-based architecture. At the very least, the architecture will have to be rethought for an easy future migration. As for the user interface, it must be subject of a careful analysis on usability and user experience, ensuring an easy start-up of the system in the environment where it will be used. Interfacing with the new external systems is another critical aspect to consider, for more details regarding these systems.
In particular, the interfacing with the railway system should be useful for:

- the possibility to create and manage the M.53 of District (called “M53 di Comprensorio”) model. The M.53 of District model will replace the M.53 Integrated model (now done by the Infrastructure Manager) and contains some additional useful data concerning operation of the Shunting Operator. These additional data could be used by the system to improve planning procedures efficiency through an optimization of train placement in railway yard and their relative movements using machine-learning techniques and logistic algorithms;
- the possibility to interact with the PIC system of RFI that allows real-time communication of changes to the general planning of arrivals and departures (e.g. deletion or changes in the schedule) and the insertion of unplanned trains through an XML protocol or similar one;
- the possibility of interfacing with the Mercitalia Rail SIM system that allows the management of waybills through an XML protocol;
- the possibility of interfacing with the Railway Undertakings IT systems (such as SIR system of Mercitalia Rail) for the recovery of information regarding train composition (list of wagons and containers carried by each wagon), useful for the automatic management of wagon groups through an XML protocol or similar one;
- the insertion of a new software component for the automatic calculation / optimization of the precedence on single tracks as Decision Support System, which assists manoeuvre planners in logistic decisions regarding train movements on the tracks beam by the proposal for the entire daily manoeuvres scheduled respecting both operational and infrastructural constraints using machine-learning techniques and logistic algorithms;
- the possibility to manage the shunting personnel through the system to assign each shunting team to their respective loco automatically.

Mapping of stakeholders

Stakeholder	Role	Importance	Contribution	Benefit	Conflict	Current support	Strategies to improve support
Italian Ministry of Infrastructure and Transport	National Authority responsible for transport policies, planning and coordination	High	Approval of policies, plans, permits and funds to implement infrastructure	Improvement of last mile connections. Increase of rail capacity	None	High	Coordination within EU TEN-T Corridors implementation
Railway Infrastructure Manager (RFI)	National infrastructure Manager	High	Approval and authorization of investments. Annual check of infrastructures	Improvement of last mile connections. Increase of rail capacity	None	High	Agreements (last 2018)
Veneto Region	Regional Authority for transport policies, planning and coordination	Medium	Approval of policies, plan, permits and funds to implement infrastructure	Improvement of last mile connections. Increase of rail capacity	None	High	Agreements (last 2018)
Esercizi Raccordi Ferroviari (ERF)	Rail Shunting Company of Venezia-Marghera Railway District	High	Port shunting operations	Reduction of shunting time. Increase of rail capacity	None	High	
Terminal Operators	Companies managing port terminal and logistics operations	High	Port terminal and logistics operations	Increase of shunting quality (time) and reduction of costs.	None	Medium	
Railway Operators	Rail transport companies	Medium	Dealing with Rail transport operations	Increased integration of Rail IT systems	None	Low	
European Rail Freight Corridors	European Network of Rail Infrastructure Managers and Rail operators	Medium	Integration among IT systems	Increased integration of Rail IT systems	None	Medium	