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ABBREVIATIONS

EU	European Union
DPW	Department of Public Works
JASPERS	Joint Assistance in Supporting Projects in European Regions
ToR	Terms of Reference
MTMA	Ministry of Transport and Maritime Affairs
MONSTAT	Montenegro Statistical Service
REBIS	Regional Balkans Infrastructure Study
SEETO	South East Europe Transport Observatory
SPP	Single Project Pipeline
SEA	Strategic Environmental Assessment

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1. Introduction

This chapter offers and overview on the scope and high-level objectives of the strategy, the status and advances in Montenegro's transport sector (including its legal context) and highlights the strategy's elements.

1.1 Overview

1.1.1 Scope

The Transport Development Strategy (TDS) of Montenegro is targeting to support the improvement of the economic efficiency, safety, accessibility and environmental sustainability of the country's transport system whilst ensuring a seamless integration of the transport sector, as well as national and EU policies. The Transport Development Strategy (TDS) will assist the Ministry of Transport and Maritime Affairs (MTMA) of Montenegro to provide a sound framework for its operations and at the same time to lay down the foundation for the future development of the transport sector in a way that is responsive to the socio-economic needs of the country, aligned with TEN-T guidelines and EU policies. The TDS will determine the condition of the various areas of transport, will define the concept of development of the transport system, establish long-term goals for the development of transport infrastructure and establish an action plan for their implementation.

1.1.2 Background

Montenegro (capital: Podgorica) is a sovereign state of approximately 650,000 inhabitants, located in the western part of the Balkan peninsula, next to the Adriatic Sea. The country's road network includes 5,277 km (1,729 paved km); no motorways currently exist (but are under planning) and main roads connecting major urban centers have single carriageways, with one lane per direction (and occasionally a third overtaking lane). The rest of the road network includes regional and local roads of lower design standards. The country's railway network consists of three (mostly) electrified, standard gauge railway corridors with a total length of 250 km; these connect the port of Bar with Podgorica and Serbia (Belgrade-Bar railway), the cities of Podgorica and Nikšić (Podgorica – Nikšić railway) and Podgorica with Albania (Podgorica-Shkodër railway). The railway line to Albania offers exclusively freight service. Railways are operated by companies, which independently handle railway infrastructure, passenger transport, cargo transport and maintenance of the rolling stock.

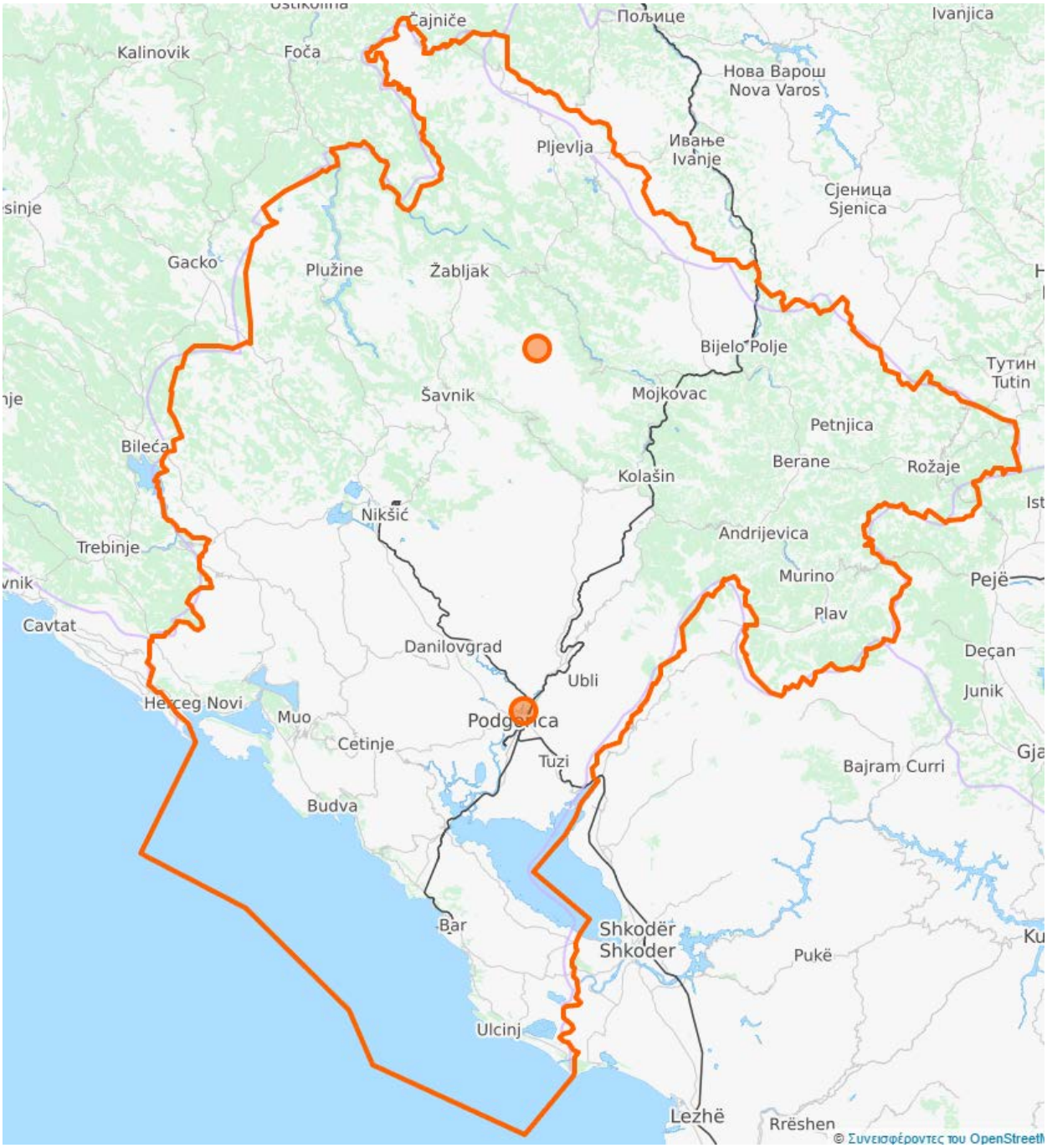

Figure 1.1: Montenegro

Apart from land borders entrances with neighboring countries, international access to and from Montenegro is possible from the port of Bar (with ferry services from Italy) and the international airports of Podgorica (TGD) and Tivat (TIV) with a total annual passenger traffic of 1.4M passengers.

Effective and efficient transportation is obviously critical for the economic and social prosperity of the citizens of Montenegro. However, problems and inadequacy of road infrastructures and traffic constraints, road accidents, a non-competitive rail system, low

usage of sustainable modes and so on, have a considerable negative impact in the country's socioeconomic growth. Montenegro is currently planning major overhauls of its road, rail networks, and possible expansions of its air transportation system. There has been a steady progress in liberalization of the Transport Sector, in inclusion in EU Rail Freight Corridor as well as market opening on the Orient/East Med Corridor.

1.1.1 High-Level Objectives

The role of the TDS is to create the path for improving and upgrading Montenegro's transportation system and to support full alignment of the country with EU policies and requirements. The TDS sets five high-level (strategic) objectives, which reflect the vision for the country's future transportation system. These are the following:

1. **Economic Welfare:** Achieve economic efficiency and financial sustainability and support economic development.
2. **Safety and Security:** Improve safety, security of people and goods in the transportation sectors.
3. **Accessibility, Performance of Operations and Quality of Services:** Provide maximum possible accessibility, offer quality transportation services and maintain an adequate performance in operations, as a whole and with respect to its individual elements.
4. **Environmental Sustainability:** Minimize carbon footprint, noise and impact to the natural, historical and socio-economic environment
5. **EU Integration:** Policies and a core transportation network, which are fully compatible and integrated to EU mandates.

In the forthcoming years, Montenegro will need a transport sector, which will efficiently support the country's economic development and ensure the socioeconomic prosperity of its citizens. In this context, the country's transportation system is expected to offer high quality services, meaning that its performance of should be improved and maintained, under possibly limited resources and operational constraints. This implies that economic efficiency and financial sustainability of Montenegro's transportation system development and operations should be ensured.

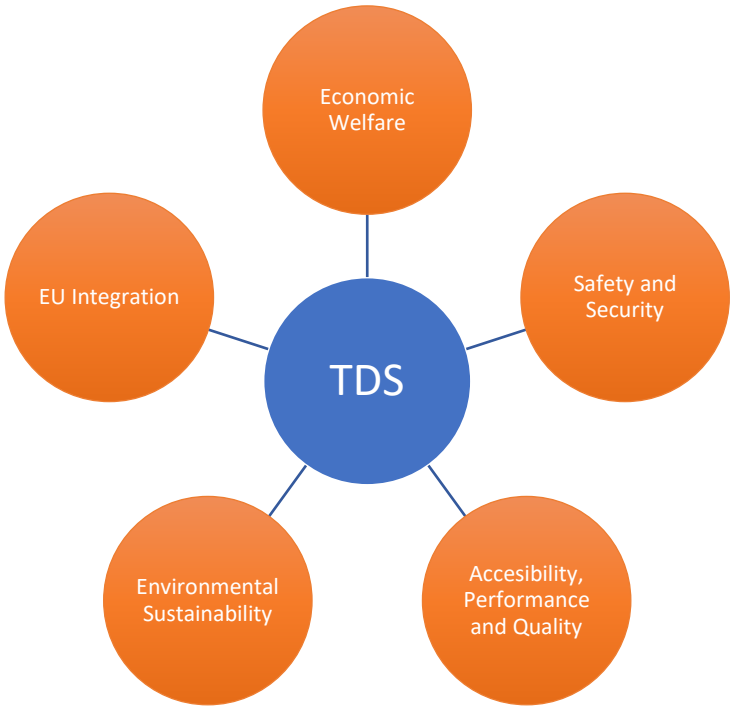

Figure 1.1: High-level TDS objectives

Furthermore, safety, security and protection of the environment are critical for the well-being of the people of Montenegro; the country's transportation system should align with EU and international mandates and best practices on sustainability in transportation. Finally, Montenegro is planning to join the EU family; alignment with EU policies and legislation in the transport sector.

1.2 Development of the Transport Sector

1.2.1 Recent Developments

In the recent years, Montenegro's transport sector has been in a state of transformation, to align its infrastructures and services with EU practices and services. The Transport Development Strategy of Montenegro for the period between 2008 and 2018 described activities related to the development of transport infrastructures, the adaptation and transposition of EU legislation and the introduction of measures in the transport sector.

In the road sector, several reconstruction and rehabilitation projects have been planned and/or implemented in the recent years (Annex A.1), of a total length of approximately 110 km and a cost of 110 million €; these projects improved the quality of the country's state roads and enhanced their level of service (mainly through the introduction of a third, overtaking lane). Motorways between Bar and Boljare and along the Adriatic coast have only been in a planning state, except for the Smokovac – Uvac – Matesevo section

of the former, which is currently under construction. Both motorways are included in the country's pipeline of infrastructure projects (Single Project Pipeline – SPP) for the forthcoming years. Traffic safety conditions were improved over the recent years, but performance is still low. The market for passenger and freight has been partially liberated, with provisions for full cabotage alleviation when Montenegro enters the European Union.

The rail sector has exhibited considerable progress in the past decade. The railway line between Podgorica and Niksic has been fully overhauled and electrified since 2012, while about 48% of the Bar – Podgorica – Bijelo Polije railway line was been rehabilitated and/or upgraded. Also, railcars have been either purchased or refurbished in the recent years. From an organizational side, the sector was restructured by separating infrastructure management from operations; four new joint stock companies were established for railway infrastructure management (Željeznička Infrastruktura Crne Gore (ŽICG)), rolling stock maintenance (Održavanje željezničkih voznih sredstava (OŽVS)), rail passenger transport (Željeznički prevoz Crne Gore) and freight transport (Montecargo). Furthermore, the market was opened to the competition, albeit no new players have entered so far.

Recent maritime sector activities involved the successful privatization of part of the port of Bar (Luka Adria); on the other hand, privatization of the remaining part of the port (Luka Bar) was halted. The first phase of a Vessel Traffic Management Information System (VTMIS) was implemented in Montenegro with the support of EU in the recent years. As for the air sector, Tivat and Podgorica airport renovation has been completed by the mid 2000's; recent developments involved strategic agreements and partnerships for airport ground handling and other services, the establishment of a statistics department and bodies on safety in air transport (mandated by EU and transposed in national legislation), the development of a national program on air transport safety, the supply of safety equipment in airports, and the improvement of emergency response and rescue services for air transport.

1.2.2 Transport Treaty

Montenegro suffers from the constraints related to its difficult topography. The quality of transport infrastructure is notably improving during the last decade, but it may take another decade until it reaches the expected high standards in terms of quality, security, capacity and management efficiency. Improvements in transport connections are guided

by the Country's declared commitment to the Vienna Summit declaration of 2015 and the priorities set out in WB6 Connectivity Agenda as it concerns technical standards, road safety programs, border crossing procedures, railway reforms and third party access.

Montenegro has established a Secretariat for Development Projects (SPP) and a methodology for defining, managing and prioritizing a Single Project Pipeline. With respect to SPP projects, the following are observed:

The rail line Vrnbica-Bar, part of the core rail network is TEN-T compliant but needs further upgrade and maintenance. The line from Podgorica to Tuzi and the state borders with Albania is currently non-compliant. The project has been included in the SPP list for completion after 2025 at an estimated cost of €35 mil., primarily for line electrification.

Route 1 (part of the Adriatic- Ionian motorway) and Route 4 (connecting the port of Bar to the state borders with Serbia at Boljare) are currently not in compliance with TEN-T guidelines, but all sections have been included in the SSP list of projects that constitute the *do-minimum future network* , with different degrees of maturity. The first section of Route 4, Smokovac- Uvac- Matesevo, is already under construction, while the rest of the sections are in the Pipeline awaiting finalization of studies and allocation of funds. Sections of the coastal highway have been included in the do-minimum network for the period 2019-2025, while the remaining ones for the period 2026-2035.. Sections of the comprehensive non-compliant network are upgraded in terms of technical standards and pavement quality under the current 2016 -2018 program or have been listed in the new 2017 – 2019 plan.

Progress is also made in the improvement to cross-border transport links which are part of the comprehensive road network, as demonstrated with the plan to reconstruct the road Ščepan Polje- Plužine (border crossing to Bosnia and Hercegovina, an SPP project) and the recent agreement for the financing of the Rožaje – Špiljani (border crossing to Serbia with connection to Kosovo) road.

Finally, expansion at the airport of Podgorica and Tivat are already been decided and the Ministry considers various options of financing. Finally, the privatization of the port of Bar (Port of Adria) has given a new prospect to the country's under-developed potential of multimodal transport.

The above program of works sets Montenegro on course to full compliance to the rules of the Transport Community Treaty of 2017 (Annex 1.1) applicable to Transport Infrastructure.

The Transport Public Sector demonstrates a maturing capacity building as it concerns infrastructure investment. It has established dedicated agencies, methodologies and procedures for project selection, it has put in force an EU-compliant Law on Strategic Environmental Impact Assessment and a body of external and independent advisors to key Ministerial Departments and Agencies.

What still needs to be improved is related to the fact that decision- making appears non-transparent to the external observer. Therefore, the present Transport Development Strategy is putting an emphasis on decision making procedures and open governance.

The needs of Montenegro's transport sector exceed the available national and IPA funds. Therefore, the aim should be to either bundle IFI loans with grants or for the country to seek PPP or concessionary investment solutions.

Effort should also be directed towards ensuring that investments in transport infrastructure are met with proving sufficient operating and maintenance budgets.

1.3 Legal Context

Montenegro's transport sector is expected be gradually fully integrated in the EU transport market based on the relevant *acquis*, including the areas of technical standards, interoperability, safety, security, traffic management, social policy, public procurement and environment, for all modes of transport. Adoption of related legislation shall apply to the extent that they concern road, rail, inland waterway, maritime transport and transport networks, including airport infrastructure; this will be done according to the Treaty on "ESTABLISHING THE TRANSPORT COMMUNITY" between the EU and South Eastern European Countries (of which Montenegro is a co-signatory). In this context, the progress of adopting EU directives and legislation so far is as follows:

In the field of **Rail Transport**, only about 15% of the EU legislation has fully been transposed. Montenegro should introduce further legislation to satisfy fully the Community Treaty requirements on

1. Market access,
2. Train driver licensing,
3. Criteria for the recognition of training centers,

4. Criteria for the recognition of examiners of train drivers and criteria for the organization of examinations,
5. Interoperability of the rail system and sub-systems (infrastructure, energy, rolling stock, control command and signaling), safety in the railway tunnels, telematics applications for freight and passenger services, operation and traffic management,
6. Railway safety, on the use of a common European format for safety, the validity of safety certificates, the certification of entities in charge of maintenance of freight wagons,
7. Inland transport of dangerous goods, and
8. Working conditions and working hours.

With respect to **Road Transport**, Montenegro has transposed 49% of the Treaty Rules. Montenegro should introduce further legislation to satisfy fully the Community Treaty requirements on:

1. Certain aspects of vehicle tachographs, i.e. the requirements for the construction, testing, installation, operation and repair of tachographs and their components,
2. Road worthiness with respect to roadworthiness tests for motor vehicles and their trailers and the technical roadside inspection of the roadworthiness of commercial vehicles
3. Driving license, technical requirements with regard to driving licenses which include a storage medium
4. Cross-border exchange of information,
5. Clean vehicles and/or alternative fuels infrastructure,
6. Standardization of ITS in urban areas, the framework of deployment of ITS in the field of road transport and for interfaces with other modes,
7. Harmonized provision of an interoperable EU-wide eCall
8. The provision of information services for safe and secure parking places for trucks and commercial vehicles
9. The provision of EU-wide real-time traffic information services,
10. Interoperability of electronic road toll systems, and on type approval.

With respect to **Maritime Transport**, Montenegro has transposed 70% of EU directives and legislation. Further legislation should be introduced to satisfy fully the Community Treaty requirements on

1. Maritime policy, establishing a Program to support the further development of an Integrated Maritime Policy.
2. Access to the market, the transfer of cargo and passenger ships between registers within the Community
3. Coordination of action to safeguard free access to cargos in ocean trades
4. Unfair pricing practices in maritime transport,
5. Criteria to be followed in order to decide when the performance of an organization acting on behalf of a flag State can be considered an unacceptable threat to safety and the environment,
6. Imposition of fines and periodic payments and the withdrawal of recognition of ship inspection and survey organizations
7. Liability of carriers of passengers by sea in the event of accidents
8. Ship-source pollution and on the introduction of penalties,
9. Training of seafarers, the mutual recognition of seafarers' certificates issued by member countries social aspects, concerning certain flag State responsibilities for compliance with the enforcement of the Maritime Labor Convention
10. Establishment of a European Maritime Safety Agency.
11. Establishment of a Committee on Safe Seas and the Prevention of Pollution from Ships.

Finally, legislation on **air transport and airports** is fully compliant with EU directives and requirements.

1.4 TDS Structure and Elements

The strategy comprises the following elements:

- Measures targeting on existing, planned, proposed and possibly new transport infrastructures.
- Measures related to the development and improvement of the organization and operations of the transport sector and subsectors.
- Anticipated strategy impacts and the strategy's implementation plan.

These elements are presented in detail in the following chapters.

2. Transport Infrastructure Measures

This chapter briefly reports on the status quo of Montenegro's transport infrastructures and presents specific strategy objectives and necessary measures proposed by the TDS.

2.1 Status Quo

A detailed data collection and consultation process yielded a detailed view on the status of Montenegro's transport infrastructures is offered for the different transport subsectors, for which developments are either under way or planned.

2.1.1 Road Sector

2.1.1.1 Existing Road Network

The total length of Montenegro's roads is approximately 5,300 km, of which around 1,700 are paved. There are currently no operating motorways (the section of Matesevo to Smokovac of the Bar – Boljare motorway is currently under construction) and interurban / regional road traffic is served by main and regional roads. These are depicted in Figure 2.1.

Main roads (Magistralni putevi) connect the country's most important cities, economic centers and border crossings. These are paved roads labeled with "M", with a single carriageway per direction (of a width of at least 3m per lane and a narrow shoulder in most cases) and a third overtaking lane on sections with steep gradients. Alignment of main roads allows a maximum speed of 80 km/h.

Regional roads (Regionalni putevi) connect regional centers, feed the main network and offer access to border crossings. These are paved roads, labeled with "R" and have reduced quality of alignments, which dictate lower speed limits than main roads. A reconsideration of category designation per road segment was undertaken in 2016, to better reflect importance and the condition of each segment. Indeed, some road segments were upgraded to main roads while others were downgraded as regional ones. In addition, connection between the capital (Podgorica) and the coast was improved by upgrading roads to Budva, Bar and Cetinje and by completing the Sozina tunnel (between Podgorica and Bar); the tunnel alone reduced the journey between the two cities by half an hour.

Figure 2.1: Main and regional roads of Montenegro (in blue and yellow respectively)

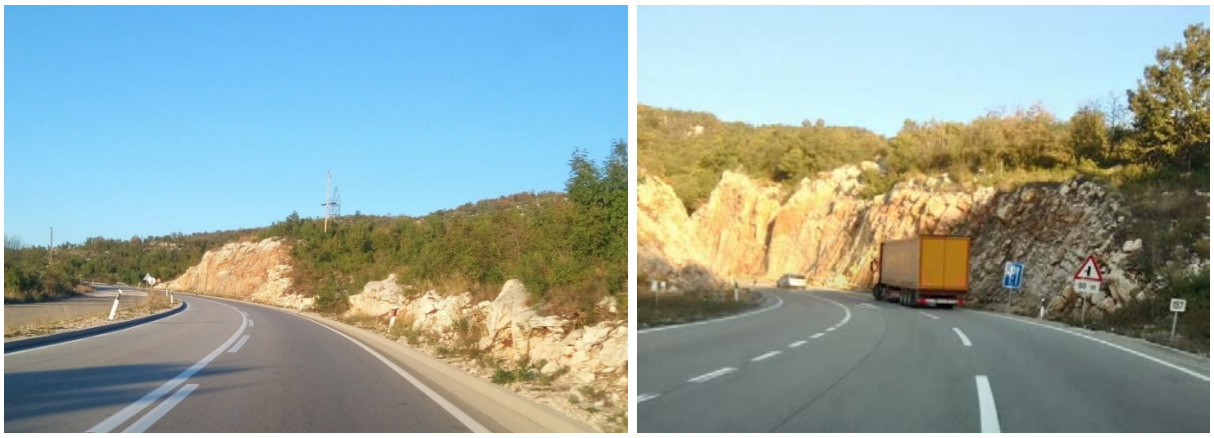

Figure 2.2: Main road in the Montenegro network (single carriageway & overtaking lane)

The design of Montenegro's main road network is rather obsolete as it involves two lane highways with occasional overtaking lanes. Performance is unavoidably low according to modern operational and safety standards for core road networks because of lower speeds, capacity and overtaking maneuvering requirements.

The pavement surface on the main roads is in good condition. Local rehabilitation works are necessary, but mostly on the mountainous and peripheral sections of the network. Except for roads which demand immediate pavement upgrades, most of the network just calls for regular maintenance checks and local interventions.

Condition of roads is good, except for local rehabilitation needs of regional roads.

2.1.1.2 Ongoing and Future Road Projects

Currently, there are there sixteen main and regional road segment reconstruction projects in progress, with a total length of 120 km and a budget of about 110 million € (Appendix A.1); these are funded by the state budget of Montenegro, the European Bank for Reconstruction and Development (EBRD) and the European Investment Bank (EIB). Another 14 road reconstruction projects of a total length of 223 km and a budget of approximately 120 million € are planned for the period between 2017 and 2019 (Appendix A.2) (also funded by the state budget, the EBRD and the EIB).

Montenegro is planning to develop a motorway network in the forthcoming years; this includes the Bar – Boljare and Adriatic motorways (Routes 4 and 1 respectively). The Bar-Boljare Highway (Route 4) (shown in Figure 2.3) will provide a safe and efficient

transport route especially in the northern part of the country. The highway was originally budgeted at 809 million €, but this is expected to increase because of fiscal costs.

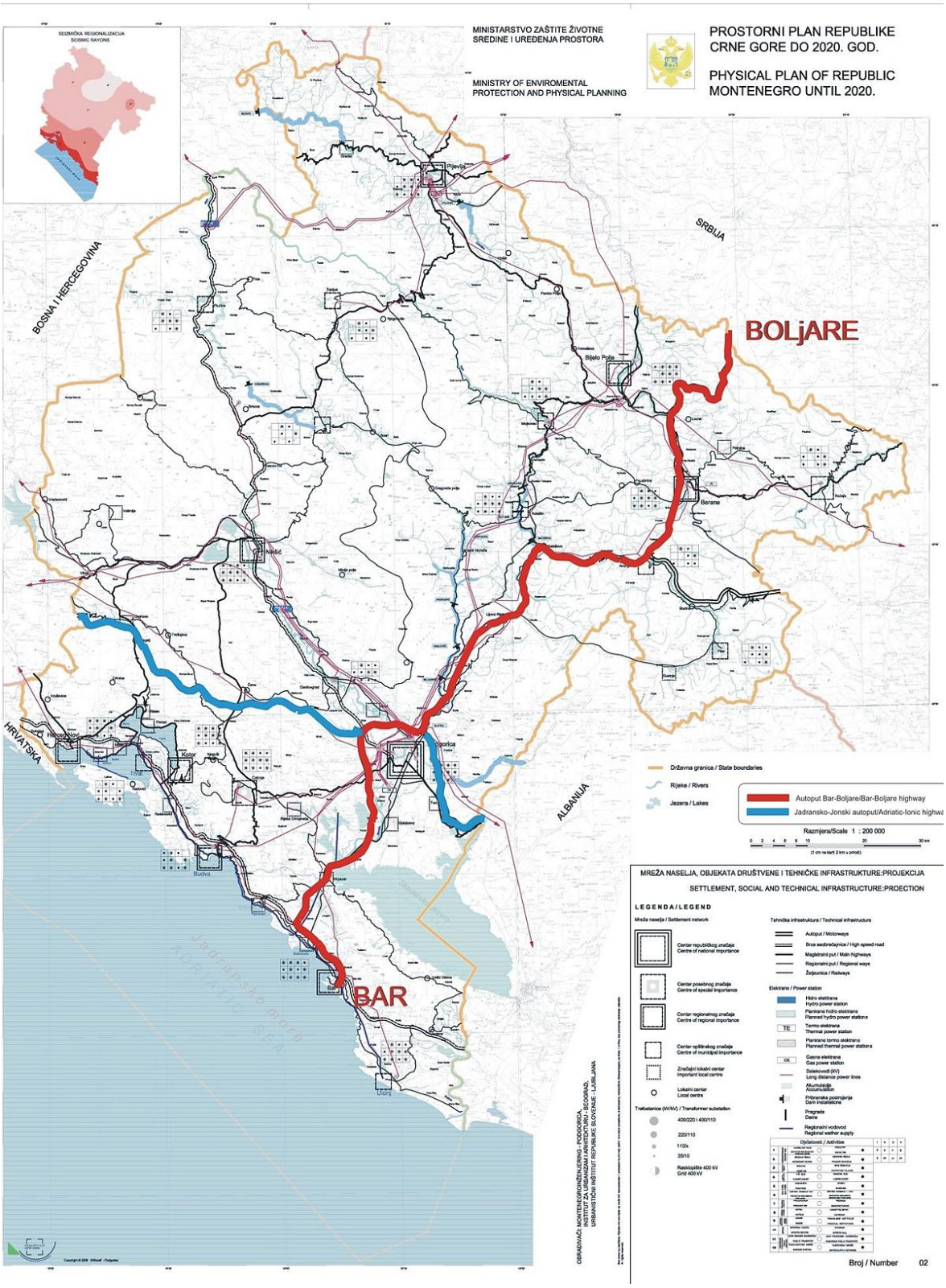

Figure 2.3: The Bar – Boljare Motorway (Route 4) (in **red**)

The motorway will be constructed in four phases: Phase I: Smokovac-Mateševo, Phase II: Mateševo-Andrijevica and bypass Smokovac - Tološi – Farmaci, Phase III: Andrijevica – Boljare, and Phase IV: Podgorica – Đurmani. Currently, the construction of the the Smokovac-Uvac-Matesevo section (41 km) progresses as a concession between the state of Montenegro and private companies[1]. With respect to the remaining phases, relevant studies are either underway or under procurement, for the Mateševo-Andrijevica and the Smokovac – Farmaci sections.

The Primorska variant of the Adriatic-Ionian Highway (Route 1) (Figure 2.4) is a motorway along the Montenegrin coast, which will improve connectivity within the region as well as the region with the EU. This is a strategic project for the region of Southeast Europe and the Balkans. Its completion will provide a high capacity corridor and quality that connects central to Europe and northern Italy with the Ionian peninsula through Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Albania and Greece. Part of the Adriatic-Ionian corridor that passes through Montenegro, from the border with Croatia to the border with Albania, is about 108 km. It consists of the bypass system around the coastal towns of Bar and Budva, Tivat, Herceg Novi and the major construction feature, a high bridge crossing over the Boka Kotorska bay - the bridge of Verige.

Figure 2.4: The Adriatic – Ionian Motorway (Source: MTMA)

[1] China Communications Construction Company Ltd.(CCCC) and China Road and Bridge Corporation (CRBC)

The estimated cost of the Adriatic motorway is 880 million euros. Because of financing constraints, segmentation and phase construction of certain sub-branches is necessary and has been identified. As for the project status, conceptual design and feasibility studies, as well as preliminary design studies for several studies have been prepared.

New motorways of Montenegro have a total estimated construction cost of approximately 1.7 billion €, which is approximately 40% of the country's GDP for 2016 4.2 billion €). It is also noted that Montenegro's public debt is approximately around 67% of its GDP for 2016 (2.8 billion €).

2.1.1.3 Demand and Level of Service

A regional transportation model for Montenegro was developed for the purposes of the TDS, which estimates and represents flows and other network performance metrics on a typical day[2]. Different scenarios for road network development are investigated for that purpose (Appendix A.2):

- The "Base" scenario refers to the country's road and rail network structure (infrastructures, operations and services) and associated demand for year 2015
- The "Do-minimum" scenarios, which refer to the country's future road and rail network structure ((infrastructures, operations and services) and associated demand for years 2025 and 2035. The "Do-minimum" networks incorporate infrastructure projects **that are more likely to be implemented** up until that period.

Currently, part of the state road network of Montenegro ("base scenario") exhibits high average daily traffic values, which are considerably augmented during summer peak seasons. This is especially the case for the coastal parts and the connection between Bar and Podgorica. Road trips are expected to grow significantly in the future and this will unavoidably have an impact to the performance of the state network, as well as planned motorways. Indeed, road transport is expected to grow by at least 45% up until 2025 and another 25% up until 2035. Planned motorways are expected to undertake relatively high average daily traffic volumes (of about 22,000 vehicles per day in 2025 and 27,000 in 2035 for worst network segments), which however will not severely affect their performance. Also, road traffic will increase for some road sections of the existing

[2] Stathopoulos, A., Kepaptsoglou, K. (2017). Transport Model and Data Collection Report. Report submitted as part of the consultancy " Preparation of the Transport Development Strategy – Montenegro", EU Delegation in Montenegro, Montenegro

state road network (for example, the main roads between Porgorica and Budva and between Podgorica and Niksic) in the future.

Traffic estimates stress the need for introducing a motorway network for Montenegro, as it is decided in the Single Project Pipeline. However, the proposed "Do-minimum" network structure will have an impact to existing state roads, which should be also upgraded to cope with increasing demand in the years 2025 and 2035.

Table 2.1 presents performance indicators for the base and "Do-minimum" scenarios:

Table 2.1: Performance indicators for the road network (typical day)

Year	Road passenger traffic			Road freight traffic		
	Trips*	Veh - km	Veh- h	Trips*	Veh - km	Veh- hr
2015	40,924	3,921,870	101,360	3,430	355,462	5,299
2025	59,752	5,020,369	75,742	4,397	399,972	4,321
2035	74,763	6,527,882	109,961	5,027	462,751	4,977

*includes trips with at least one trip end in Montenegro

Total travel distance (measured in vehicle-kilometers, veh-km) increases in the future, since total route lengths are not radically reduced (new motorways run in parallel to the existing network) and volumes increase. On the other hand, the introduction of motorways reduces considerably travel time and therefore total veh-hours are reduced compared to the base network.

Large part of the network near the coast and those segments between the coast and Podgorica exhibit a rather low Level of Service (LOS) for two lane highways, especially during traffic peak periods. Proposed motorways will operate on average at a good level of service in most segments. Part of the main road network will benefit from motorways, despite the increase in overall road traffic. However, there are candidate bottlenecks during peak hours in peak seasons and actions are required for improvement of their operation.

While LOS for the current network is rather low, the introduction of the "Do-minimum" motorways will improve the LOS to the state road network despite the considerable increase in demand for road transport. Some candidate bottlenecks will be anticipated in a few "Do-minimum" network segments in later years.

2.1.1.4 Costs and Financing

Capital investments for roads ranged from 30M Euros to 50M euros, for years between 2010 to 2014; total programmed investments for that period accounted for 193M Euros, out of which 149M were actually spent (77%). For years 2015 to 2017, the introduction of the Matesevo – Smokovac (part of the Bar – Boljare motorway) boosted state road capital investments to a total of 585M Euros (programmed); for years 2015 and 2016 actual expenditures corresponded to 82.5% of planned budget. For routine maintenance, expenditures have been declining in the past years; this may be attributed to major rehabilitation activities, which lead to reduced needs for routine maintenance in state road segments.

Ongoing and planned reconstruction projects in the recent years have been partially funded by the state budget and loans by the EIB and EBRD; in cases of loans, state contribution accounted for 15%-20% of expenditures. The Bar-Boljare motorway is funded at a level of 85% by a loan from the Chinese Bank EXIM, following an agreement

Investments on road infrastructures have been increasing considerably in the recent years because of expenditures for the Matesovo – Smokovac motorway segment construction. On the other hand, routine maintenance costs have been slightly reduced. Actual road expenditures are often lowed that budgeted expenses. Large part of expenditures is covered by loans from international financing institutes.

2.1.2 Rail Sector

2.1.2.1 Current Network

The rail network of Montenegro has a length of 250 km and consists of single-track lines of category D4 and a standard gauge (1,435 mm). For most of its length (225 km), the network is electrified and has an allowable axle load of 22.5 t. Rail infrastructures include 121 tunnels of a total length of 58 km, 120 bridges, 9 galleries and 440 culverts. The network consists of three railway lines converging in Podgorica (Figure 2.5).

Figure 2.7: The Montenegro Rail Network (Source: MTMA)

In total, Montenegro has 18.4 m of railway lines per km^2 and 0.40 km per 1000 inhabitants[3]

The Belgrade-Bar line is the backbone of the Montenegrin railway system. It is fully electrified and features the highest railway viaduct in Europe (the Mala Rijeka viaduct) and the 6.2 km long Sozina tunnel. About one-third of the Montenegrin part of line is in a tunnel or on a viaduct. The Nikšić-Podgorica line (56.6 km long) was thoroughly reconstructed and electrified in 2006-2012 period, with passenger service

[3] http://ec.europa.eu/eurostat/statistics-explained/index.php/Enlargement_countries_-_transport_statistics

reintroduced. Operating speeds on the Nikšić-Podgorica line range between 75 km/h and 100 km/h. The Podgorica-Shkodër railway, which extends to Tirana, has been used exclusively for freight traffic. There are plans to reconstruct the railway and introduce passenger traffic between Montenegro and Albania.

Rail corridors are fully electrified, and several segments have been either reconstructed and/or upgraded in the past years. The fact that rail corridors are of a single track reduces their capacity. Also, there is a limited number of stations along these corridors. There is no railway connection with Montenegro's northern neighboring countries (Bosnia & Herzegovina, Croatia) and the railway connection with Albania needs major upgrade on both sides of the border to be able to handle passenger traffic.

2.1.2.2 Recent, Ongoing and Future Projects

Since 2006, a total amount of EUR 123.1 million was invested in rehabilitation and modernization of Montenegro's railway infrastructure, for the overhaul and electrification of the Nikšic – Podgorica line and the overhaul of the (Belgrade) -Vrbnica-Bar line. With respect to the Vrbnica-Barm line, so far, its northern part has been rehabilitated: Vrbnica-Kolasin (53.2 km), with additionally contracted overhaul of Kolašin-Kos (10.9 km) and Kos-Trebešica (7.3 km, with secured financing) for a maximum speed of 75-80 km / h. Remaining works include the general overhaul of the line's remaining 96 km (Trebešica-Bar), the preparation of the main project for rehabilitation of existing signaling in Podgorica station and concrete bridges (a total of 91 bridges), preparation of the main reconstruction and rehabilitation project for 106 tunnels, procurement of equipment for maintenance of railway infrastructure, (14 steel bridges, 91 concrete bridge, 12 slopes and landslides in a total length of 3km), reconstruction of the track and facilities at three stations, reconstruction of the existing signaling and contact lines along the line and modernization of the security system and video surveillance. The estimated duration of the project is 15 years. There is technical documentation for most of the phases of the project ready for the preparation of the tender or implementation of the tender procedure. Ongoing railway projects in the Vrbnica-Bar are presented in Appendix B.1.

The upgrade and modernization of the Podgorica – Tuzi railway line has been included in Montenegro's single project pipeline (SPP) for the next 15 years. However, no detailed technical studies or relevant works have been initiated so far. Any progress on that project is directly related to actions undertaken by the Albanian side. Also, the SPP considers the expansion of the Podgorica – Niksic railway line to Trebinje in Bosnia &

Herzegovina, following the over 40 years abandoned narrow-gauge line corridor between Niksic – Bileca and Trebinje (formerly known as Dalmatian and Zelenika railway).

2.1.2.4 Demand

Following the same methodology as in the road sector, railway ridership and freight volumes were estimated for current ("base") and future ("do-minimum") conditions. Current conditions refer to the existing railway lines and operations, while the future case consider rail passenger operations between Podgorica and Tuzi (Albanian border) and the Podgorica – Niksic railway line extension to Bileca and Trebinje (shown in Appendix A.2). Estimates for passenger ridership and freight, along with performance measures are presented in Table 2.2:

Table 2.2: Railway Usage and Performance Measures (typical day)

Year	Rail passenger traffic			Rail freight traffic	
	Trips*	Passenger - km	Passenger- hr	Freight Volumes*	Ton – km
2015	11,725	204,680	2,558	2,705	387,351
2025	16,778	297,580	3,710	3,788	542,943
2035	22,863	405,758	5,059	5,063	665,948

*includes trips with at least one trip end in Montenegro

2.1.2.5 Costs and Financing

The overhaul and electrification of the Podgorica – Niksic railway line for the period between 2006 and 2012 had a cost of approximately 65,000,000 €, which was funded by loans from Česká Exportní Banka (ČEB) (50,000,000 €) and the European Bank for Reconstruction and Development (EBRD) (15,000,000 €). Since 2008, approximately 68,000,000 € have been spent for overhauling the Bar – Vrbnica line; funding was covered by loans obtained from the EBRD (14,000,000 €), the European Investment Bank (EIB) (7,000,000 €), ČEB (800,000 €), by the Western Balkans Investment Framework ((3,500,000 €) and instruments for Pre-accession Assistance (43,000,000 €). Another 2,500,000 € were obtained from state funds (details are presented in appendix B.1). Regular maintenance costs have remained relatively steady in the recent years (approximately 6,000,000 Euros annually). On the other hand, subsidies to the railway sector have increased in the same period; these are used for paying installments of loans spent in overhauling the rail network and for covering deficits in

revenues versus operating costs for the infrastructure manager (ZICG) and the passenger carrier (ZICG-Prevoz).

Railway overhauls were heavily financed by loans from credit institutes and EU financing instruments in the last decade; over 120M € were spent for that purpose. Railway maintenance needs remain relatively constant over the recent years. On the other hands, subsidization of both the infrastructure manager and the passenger operator have been increasing rapidly and doubled in 2016; subsidies are used for loan repayment and covering operational costs of the infrastructure manager and operator.

2.1.3 Air Sector

2.1.3.1 Existing Infrastructures

Air transportation in Montenegro is facilitated by two international airports (Podgorica and Tivat).

The Podgorica Airport (IATA: TGD, ICAO: LYPG) serves the capital of Montenegro; it has a single 2500 m x 45 m runway with a North-South orientation (runway 18/36), and an ICAO classification 4E ILS Cat I. However, ILS landing is possible only on runway 36 (from the south), as northern approach to runway 18 is visual only, possible under perfect VMC. This is due to proximity of Dinaric Alps in the north. The airport also has 14 taxiways, 6 aircraft stands for Code C aircraft, with a possibility to park Code D aircraft on stands 5 and 6, 3 aircraft stands for general aviation aircrafts (wingspan ≤20m), 1 aircraft stand on technical apron for Code C aircraft, a 5500 m² passenger terminal, 8 check-in counters, 8 gates (two for arrivals and 6 for departures) and 2 baggage claim carousels.

The Tivat airport is located right next to the city of Tivat, 8 km from the city of Kotor, and 20 km north-west of Budva. Its 2500 m x 45 m single runway (14/32) ends just 88 m from the coastline of the Kotor bay. The Tivat Airport exhibits incomplete compliance with international regulations with respect to its runway protection zone. It has an ICAO 4D classification and is noted for its challenging approach and landing procedures, due to hilly terrain around the airport is located, and prevailing strong crosswinds. The airport facilities include 2 taxiways, 7 aircraft stands (5 for Code C aircraft + 2 for Code D aircraft), 12 aircraft stands for general aviation aircrafts (wingspan ≤20m), a 4050 m² passenger terminal, 12 check-in counters, 6 gates and 2 baggage claim carousels.

Apart from the country's two international airports, the Berane (Dolac) airport has a paved runway and a terminal (since it used to be an international airport in the past), but its current conditions, lack of equipment and short runway (under 2000 m) prohibit its possible exploitation for other purposes apart from general aviation.

2.1.3.2 Future projects

Future projects for the airport of Podgorica, include the extension of the passenger terminal, the improvement of the maneuvering area and apron, the expansion of air cargo facilities, and the relocation of the airport's fuel farm and energy station. Interestingly, the Podgorica Airport is not incorporated in the Urban Planning Plan of the Municipality of Podgorica. To this effect, Airports of Montenegro requested the preparation of a Local or State Location Study for Podgorica Airport by the Municipality of Podgorica. It is noted that without this document, Airports of Montenegro cannot realize any expansion projects.

As for the Tivat airport, its capacity is already insufficient to handle demand during the summer peak season and therefore an expansion is required. A concept design for modernizing Tivat Airport has been prepared, which includes the following projects:

- The existing terminal building (4,050 m^2) will be reconstructed and a new terminal building will be constructed (13,000 m^2) and will be connected to the existing terminal building.
- Part of the old terminal will be refurbished to become the new General Aviation and VIP terminal; all functions for these facilities will be located within the old terminal.

A new airside concept design for the airport will include: (1) the rehabilitation of the airport maneuvering area pavements, including the runway, (2) the widening of the commercial aviation apron, its link taxiways to the runway, new proposed taxiway and utilities, (3) the displacement of the runway thresholds in order to comply with international safety regulations and (4) the relocation of the Tivat - Ostrvo Cvijeca road.

The two Montenegrin international airports are in a phase where expansions and upgrades are required to cope with increasing seasonal air traffic; their terminals are inadequate and require expansion. Several projects are planned, especially for the Tivat Airport, for which demand is expected to get further boost in the future years.

2.1.3.3 Demand

Table 2.3 presents annual passenger traffic estimates for Montenegro's airports, for years 2025 and 2035.

Table 2.3: Annual Passenger traffic forecasts for Montenegro Airports (Source: Transport Model Outputs)

Airport	2025	2035
Podgorica	1,674,967	2,605,269
Tivat	2,258,738	3,645,596

Air passenger traffic for the Tivat airport will exceed that of the airport of Podgorica for future years 2025 and 2035.

2.1.3.4 Costs and Financing

In the past years, investments on airports were estimated at about 37 million €. Estimated costs for airport modernization are 150 million € (95 million € for Podgorica airport and 55 million € for Tivat airport).

2.1.4 Single Project Pipeline

The quality of Montenegro's transport infrastructure is notably improving during the last decade, but it may take another decade until it reaches the expected high standards in terms of quality, security, capacity and management efficiency. Improvements in transport connections are guided by the Country's commitment of the Vienna Summit of 2015 and the priorities set out in WB6 Connectivity Agenda with respect to technical standards, road safety programs, border crossing procedures, railway reforms and third party access. In this context, Montenegro has established a Secretariat for Development Projects and a methodology for defining, managing and prioritizing a Single Project Pipeline (SPP). Projects included in the Single Project Pipeline are summarized in Table 2.4, along with their estimated costs:

Table 2.4: Single Project Pipeline

No.		Project title	Subsector	Estimated cost (€)
1		Reconstruction and modernization of the railway line “Vrbnica-Bar", state border with Serbia	Rail	246.500.000,00
2		Construction of Bar-Boljare motorway, section Mateševo - Andrijevica	Roads	294.840.000,00
3		Adriatic-Ionian Motorway along Montenegro's coast	Roads	1.013.001.000,00
	3.1	Section Border with Croatia-Bijela (17km) (Bypass Herceg Novi (8km) & Herceg Novi-Bijela (9km))		193.228.000,00
	3.2	Bridge over the Boka Kotorska Bay, viaducts and access roads		67.925.000,00
	3.3	Bypass Tivat		56.430.000,00
	3.4	Bypass Budva (14km, part of section Tivat-Sozina 47km long)		158.388.000,00
	3.5	Bypass Bar		188.000.000,00
	3.6	Section Tivat-Sozina		198.550.000,00
	3.7	Section Bar-Border with Albania		150.480.000,00
4		Motorway Bar-Boljare, bypass Podgorica, section Smokovac – Tološi - Farmaci	Roads	233.122.000,00
5		Motorway Bar-Boljare, section Đurmani - Farmaci	Roads	440.640.000,00
6		Motorway Bar-Boljare, section Andrijevica – Boljare	Roads	731.160.000,00
7		Reconstruction and modernization of the railway line Podgorica - Tuzi – across the border with Albania	Rail	35.000.000,00
8		Reconstruction of the Šćepan Polje-Plužine highway (border crossing with Bosnia and Hercegovina)	Roads	60.000.000,00
9		Development of the Podgorica Airport	Air	94.842.387,60
10		Vessel Traffic Management Information System (**VTMIS)** response to maritime pollution incidents - PHASE II	Maritime	4.200.000,00
11		Construction of the railway Nikšić- border with BiH-Trebinje-Čapljina	Rail	179.597.190,00
12		Development of the Tivat Airport	Air	55.000.000,00

The total estimated cost of the single project pipeline is approximately 2.5 billion Euro.

2.2 Problem Analysis

Based upon collected data and consultation, infrastructure related problems are identified and discussed. Next, specific strategy objectives are set according to highlighted problems.

2.2.1 Main Findings

2.2.1.1 Network Quality and Coverage

The road network exhibits a good pavement condition on most main roads, as rehabilitation may be required only in some mountainous sections of regional roads of secondary importance. Performance and reliability of the road network is obviously limited by the fact that the core network consists of two lane highways, with a single carriageway per direction, often in a hilly or mountainous terrain (which implies alignments with sharp curves, increased vertical slopes and limited overtaking sections). As such, allowable speeds are limited to 80 km/h in main roads, to 50 km/h in regional roads and overtaking maneuvers are required around the network. Fortunately, in some segments of the main network (particularly in those with increased vertical slopes), there exists a third lane, which is dedicated to overtaking and facilitates such maneuvers. Shoulders are of inadequate width in many segments, compromising road operations and safety in cases of incidents and vehicle malfunctions. Furthermore, weather conditions have an adverse effect in the operations and conditions of mountainous sections of the main road network.

The existing road network has a limited capacity and yields low travel times due to its alignment, implemented cross-sections and the need for overtaking. Its performance and reliability to support local connectivity needs and transit flows is low base on modern standards. Furthermore, the country's existing state road network cannot efficiently handle road freight transport (apart from local needs).

Current LOS conditions seem to be adequate for large part of main and regional roads. A C and D LOS is exhibited in sections of the coastal main road (M2.4) between Bar and Budva and around Kotor, as well as in sections of the main road (M2) Bar – Podgorica - Serbian Border. A conservative evaluation of these sections is that most of them are still performing adequately but are close to operational capacity (setting LOS C as the limit for establishing road segment capacity). However, given estimates for demand in future years (2025 and 2035), a "do-nothing" case of only retaining the

existing conditions would degrade many network segments to a D and even F LOS. On the other hand, the “Do-minimum” scenarios for years 2025 and 2035 involves the introduction of two major motorways, whose path is parallel to main roads exhibiting lower LOS in current conditions. Increased future demand for road transport is accommodated by new infrastructures and only a couple of segments exhibit LOS “C” for year 2035. This fact alone highlights the adequacy of already proposed infrastructures to undertake future road traffic flows of Montenegro’ state road network.

As for railways, over 48% of Montenegro’s rail infrastructure has been rehabilitated in the recent years and overhauling work on remaining segments is either ongoing or planned. The network is almost fully electrified (225 km out of 250 km or 90%), which is among the highest in Europe (the EU average is 52%). Maximum allowable speeds remain low and range between 50 km/h and 100 km/h while the fact that the rail lines are single track reduces their capacity and allowable frequencies of operations.

Montenegro is not well positioned with respect to EU average with respect to deaths attributed to road accidents but close to the maximum value exhibited in the EU. Furthermore, compared to neighboring countries, the performance of Montenegro is worse. On the other hand, the EU target of reducing deaths in the Union by at least 29%, for the period between 2010 and 2015 has been exceeded, as deaths per 1,000,000 inhabitants in Montenegro have been reduced by 32% during this period.

Overall, Montenegro is well placed with respect to the road and rail coverage with respect to the country’s population, compared to other enlargement countries and the EU. Indeed relevant figures of 13.8 km of road and 0.40 km of rail per 1000 inhabitants are respectively larger than and close to the EU average values. Road spatial density is higher than that of other enlargement countries (624 m per km^2).

2.2.1.2 Road Level-of-Service

2.2.1.4 Future Infrastructure Plans

Montenegro is planning to construct two new motorways (the Bar - Boljare and Adriatic Motorways), reconstruct the highway corridor to the border with Bosnia & Herzegovina (main road Šćepan Polje-Plužine), and rehabilitate several parts of the state highway network (including the addition of a third, overtaking lane in several parts). Rehabilitation of the country’s railway network is also underway and/or planned (Bar – Podgorica – Bijelo Polje and Podgorica – Tuzi sections), and a new railway line is

planned to connect Montenegro and Bosnia & Herzegovina (using an existing corridor between Belica and Niksic). An extensive modernization of the Tivat and Podgorica airports is also programmed in the forthcoming years.

2.2.1.5 Financing

Proposed infrastructure projects in the single project pipeline yield high expenditures, which cannot be handled by Montenegro's state budget. Indeed, transport infrastructure expenditures in Montenegro have risen to over 5% of its GDP in past couple of years. Given the size of Montenegro's GDP and public debt (which exceeds over 60% of the country's GDP), traditional financing schemes such as loans are neither viable nor desirable. Additional infrastructure interventions (such as road rehabilitations in the county's comprehensive road network) and the introduction of intelligent transportation systems in the state network could yield additional funding requirements. As such, Montenegro should seek alternative funding schemes, especially in the form of concessions and public-private sector partnerships. With respect to services, railways exhibit low cost-recovery ratio and high subsidization; these are attributed to repayment needs of railway overhaul loans in the past years, as well as to deficits of revenues with respect to operating costs.-

2.2.2 Infrastructure Objectives

Four priority areas are identified for Montenegro's transport infrastructures. These are:

- Priority Area 2: Transport Investments
- Priority Area 3: Performance of Networks
- Priority Area 6: Intelligent Transportation Systems
- Priority Area 7: Intermodality and Road Freight Transport

Relevant specific objectives, targeting into transport infrastructures are presented in Table 2.6:

Table 2.6: Specific objectives targeting on transport infrastructures

#	**Objective**	**Expected Outcomes**
Priority Area 2: Transport Investments		
2.1	Complete infrastructure projects in SPP Sector: Road, rail, air	• Modern core motorway network • Upgraded and expanded railway network • Upgraded airport infrastructures

#	Objective	Expected Outcomes
		• Improved accessibility within the country and to and from neighboring countries
Priority Area 3: Performance of Networks		
3.1	Maintain adequate LOS of state road network Sector: Road	• Road network of good condition • Upgraded geometric characteristics • Increased speeds and reduced travel times • Reliability in travel times • Safe road environment • Better accessibility
3.2	Improve traffic safety Sector: Road	• Reduced number of accidents in state network • Reduced number of road accident fatalities and injuries
3.3	Complete rail network overhaul and improve rail infrastructures Sector: Rail	• Increased travel speeds • Higher corridor capacity • Safer operations • Travel convenience
3.4	Upgrade rail services	• Adequate service frequency • Timetable reliability • Increase in traveler share and ridership
3.5	Align rail with interoperability requirements	• Installation of appropriate signaling and safety technologies (ATS, ATP etc).
3.6	Reduce border clearance times Sector: Road, rail	• Lower access and transit times for passenger and freight movements.
3.7	Revitalize and / or upgrade transport infrastructures Sector: Air	• Existing / abandoned transport infrastructures exploited
Priority Area 5: Management of Rail and Port Services		
5.2	Improve connectivity in port of Bar	• Increased freight flows • Improved port competitiveness

#	Objective	Expected Outcomes
		• Full privatization of the port of Bar
Priority Area 6: Intelligent Transportation Systems		
6.1	Deployment of ITS technologies in the road, rail and maritime sectors Sector: Road, rail	• Upgraded services to users and travelers • Advanced monitoring and management of network operations. • Performance and safety improvement in networks
Priority Area 7: Intermodality and Freight Transport		
7.1	Reinforce the creation of an efficient and integrated transport system through intermodality	• An efficient transport system, integrated in the region and in the EU network, which promotes economic development and the citizens quality of life • Create favourable conditions for the intermodal and combined transport and logistics • Attract investments • Reduce rail transit times and transport costs • Establish joint border crossings • Reduce logistics costs
7.2	Enhance support for road freight transport Sector: Road	• Establishment of facilities and services to road freight operators

2.3 Proposed Measures

Necessary measures are identified and proposed for tackling specific objectives. As these measures may respond to more than one objective, they are grouped according to the same priority areas as those of specific objectives.

2.3.1 Priority Area 2: Transport Investments

Infrastructural measures related to transport investments focus on projects (new investments) included in the Single Project Pipeline; the objective is to complete projects included in the single project pipeline (Objective 2.1). These measures are:

- **Program and monitor single pipeline projects for target years 2025 and 2035**
- **Continue and intensify actions towards completion of projects in SPP**
- **Align and possibly coordinate project activities and programming with those of neighboring countries**

Projects per sector and programming are summarized in Table 2.7:

Table 2.7: Projects in SPP list.

Sector	Year 2025	Year 2035	Align with neighboring countries
Road	Reconstruction of the Šćepan Polje-Plužine highway (border crossing with Bosnia and Hercegovina) Motorway Bar-Boljare, section Mateševo – Andrijevica Motorway Bar-Boljare, section Andrijevica – Boljare Adriatic Motorway, Bypass Tivat Adriatic Motorway, Bypass Budva Adriatic Motorway, Section Tivat-Sozina	Adriatic Motorway, section Border with Croatia - Bijela (Bypass Herceg Novi & Herceg Novi-Bijela) Adriatic Motorway, section Bar – Border with Albania. Adriatic Motorway, Bypass Bar Motorway Bar-Boljare, bypass Podgorica, section Smokovac – Tološi - Farmaci Motorway Bar-Boljare, section Đurmani – Farmaci	Yes
Rail	Reconstruction and modernization of the railway line “Vrbnica-Bar", state	Reconstruction and modernization of the railway line Podgorica - Tuzi – across	Yes

Sector	Year 2025	Year 2035	Align with neighboring countries
	border with Serbia	the border with Albania Construction of the railway Nikšić- border with BiH – Trebinje - Čapljina	
Air	Development of Podgorica Airport Development of Tivat Airport		No

Montenegro should proceed and intensify actions for carrying out all technical actions necessary for completing SPP projects, without compromising quality or capacity or time of completion. This requires in any case strict programming and continuous monitoring of project progress in the timeframe of the strategy. Also, several projects of the SPP are interrelated with projects of neighboring countries. For example, any railway improvement in the Podgorica – Tuzi rail line should be in line and coordinated with improvements in its Albanian counterpart. Similarly, success of the Bar – Boljare motorway is related to the completion of the motorway between Boljare and Belgrade, in Serbia, so that a complete motorway corridor is eventually formed between Belgrade and the Adriatic coast. The same considerations apply for the Adriatic motorway and the railway extension to Bosnia & Herzegovina.

2.3.2 Priority Area 3: Performance of Networks

Several measures focus on maintaining the performance of state roads (Level of service, traffic safety), rail infrastructures and rolling stock, border crossings and other transport infrastructures (Objectives 3.1, 3.2, 3.3, 3.5 and 3.8).

Measures related to the road sector are:

- **Complete planned road reconstruction projects (2017-2019)**
- **Reconstruct remaining state road sections with state borders to Kosovo and B&H.**
- **Upgrade roads to recreational areas (ski and coastal resorts).**
- **Improve signage and road furniture of main roads**
- **Add booths in road border crossings**

Already planned road reconstruction projects are necessary for maintaining a good LOS in the future; while new motorways will undertake most of the future demand for road transport, traffic in several segments of the state network will increase. This implies that some additional segments, forming corridors to between Podgorica and the border with Bosnia & Herzegovina and Kosovo, should be improved (reconstructed), to facilitate growing traffic between these countries and Montenegro. These sections are presented in Table 2.8. Road reconstruction along with improvements in signage and road furniture will also have a positive impact in the country's road safety status. Also, introduction of booths in road border crossings will allow reducing large transit times encountered, especially during summer peak periods.

Table 2.8: Remaining State road sections to be reconstructed and upgraded

ID	Road Section	Completion Year	
		2025	2035
1	Danilovgrad – Niksic	√	
2	Niksic – Vilusi		√
3	Pluzine-Niksic	√	
4	Andrievica – Vuce – Border with Kosovo		√

Measures related to the rail sector are:

- **Expand service length of selected rail stations to 740 m**
- **Introduce ERTMS in rail network.**
- **Purchase passenger and freight rolling stock**

The introduction of ERTMS in the rail network will improve rail operations and safety, upgrade services to passengers and allow interoperability with other EU railways. Also, introduction of new rolling stock will aid in improving performance of operations and providing additional passenger and freight transport capacity by state-owned passenger and freight carriers.

Finally, measures related to other transport infrastructures sector are:

- **Revitalize Berane airport through a concession process**

The Dolac airport of Berane should be revitalized in order to support connectivity and accessibility of Northern Montenegro (and contribute in the area's attractiveness for tourist activities). However, given the fact that this airport has not been used for commercial flights for over 25 years, a successful revitalization will require the participation of the private sector. A private partner in some form of concession can provide necessary funds for reconstructing the Dolac airport and create all necessary actions and synergies for attracting air traffic.

2.3.4 Priority Area 5: Management of Rail Services and Ports

Priority area 5 infrastructural measures aim at improving port services ports (Objective 5.2). Related infrastructural measures include:

- **Improve rail connection segments to port of Bar**
- **Expand piers and passenger terminal**

Currently, the port of Bar is hindered by inefficient connection with the railway network; rail connections should be physically improved. Also, if connectivity is improved overall (introduction of new motorways, overhaul of the rail network etc), pier and passenger terminal expansion could be considered.

2.3.5 Priority Area 6: Intelligent Transportation Systems

Priority area 6 measures focus on the introduction of intelligent transportation systems in Montenegro's transportation systems (Objective 6.1). Related infrastructural measures include:

- **Installation of ITS equipment in the core road network (variable message signs, dynamic signage etc).**
- **Installation of weight-in-motion stations**
- **Establishment of an integrated system for monitoring and information provision of interurban public transport.**
- **Completion of Vessel Traffic Management Information System (VTMIS) (phase II).**

Montenegro is expected to align with EU legislation and requirements on the introduction of ITS in its core network. As such, ITS systems should be installed according to EU standards. Introduction of weight-in-motion stations is necessary for monitoring truck traffic and loads in the country's road network. The country's interurban

public transport network offers scattered services without any monitoring of provided services or centralized information for passengers. As such, access and usage of the public transport network is hindered, at least for tourists; this has an impact to the country's tourism industry and economy. Introduction of ITS in this case would enhance provided services in interurban public transport. Finally, the country's VTIMS is partially completed; phase II is to be installed, as described in the list of SPP projects. A detailed description of ITS aspects to be considered is given in Appendix C of this text.

2.3.6 Priority Area 7: Intermodality and Freight Transport

Priority area 7 measures refer to enhancing intermodality and supporting freight transport (Objective 7.2). Related infrastructural measures include:

- **Develop intermodal stations in Podgorica and Bijelo Polje.**
- **Develop rest and service areas in the core network and main roads.**

Currently, rail freight operations are hindered by rail conditions and services in neighboring countries (Albania and Serbia), while no actual rail connection exists with Montenegro's remaining neighbors. Furthermore, railway's participation in intermodal activities is minimal, as competition from road freight transport in the port of Bar is strong. In order to achieve intermodality and exploit rail capacity and qualities, it is necessary to create intermodal stations in two locations along the country's main rail corridor (in Podgorica and Bijelo Polje). These stations will facilitate rail transportation of containers from the port of Bar to the inland parts of the country and reduce road freight traffic (and travel times) in corridors where increased road passenger traffic is observed. As for rest areas, these are required by EU legislation and should be established in the core network and main roads leading to neighboring countries.

2.3.6 Summary of Infrastructural Measures

Table 2.9 summarizes measures per transport sub-sector and objectives addressed:

Table 2.9: Summary of infrastructure measures

ID	Objective	Infrastructure Measures
2.1	Complete infrastructure projects in SPP	• Program single pipeline projects for target years 2025 and 2035. • Continue and intensify actions towards project completion. • Align project activities and programming with those of neighboring countries
3.1	Maintain adequate LOS of state road network	• Complete planned road reconstruction projects (2017-2019) • Reconstruct state road sections with state borders to Kosovo and B&H. • Upgrade roads to recreational areas (ski and coastal resorts). • Improve signage and road furniture of main roads
3.2	Improve traffic safety	
3.3	Complete rail network overhaul and improve rail infrastructures	• Expand service length of selected rail stations to 740 m • Introduce ERTMS in rail network. • Purchase passenger and freight rolling stock
3.4	Upgrade rail services	
3.5	Align rail with interoperability requirements	
3.6	Reduce border clearance times	• Add booths in road border crossings
3.7	Revitalize and / or upgrade transport infrastructures	• Revitalize Berane airport
5.2	Improve connectivity in port of Bar	• Improve rail connection segments to port of Bar • Expand piers and passenger terminal
6.1	Deployment of ITS technologies in the road, rail and maritime sectors	• Installation of ITS equipment in the road network (variable message signs, dynamic signage etc). • Installation of weight-in-motion stations • Establishment of an integrated system for monitoring and information provision of interurban public transport. • Completion of Vessel Traffic Management Information System (VTMIS) (phase II).
7.1	Reinforce the creation of an efficient and integrated transport system through intermodality	• Develop intermodal stations in Podgorica and Bijelo Polje.
7.2	Enhance support for road freight transport	• Develop rest and service areas in main roads.

3. Transport Sector Measures

This chapter briefly reports on the status quo on the organization and operations of Montenegro's transport sector and subsectors and presents specific strategy objectives and necessary measures proposed by the TDS.

3.1 Status Quo

A detailed data collection and consultation process yielded a detailed view on the status of Montenegro's organization and operations is offered for the different transport subsectors.

3.1.1 Transport Sector Organization

3.1.1.1 Central Government

The Ministry of Transport and Maritime Affairs (MTMA) consists of five sub-sector specific directorates (road infrastructure, road traffic, railway traffic, air traffic, maritime traffic, a directorate on international cooperation and IPA funding), along with five offices for financing, public procurement, common affairs and human resources, and normative – legal affairs. The structure is vertical with respect to transport sub-sectors (road, rail, maritime, air), while offices operate on a horizontal manner, covering aspects related to all modes. All directorates are under the secretary of the Ministry.

The structure of the general government agencies is straightforward, with each directorate being isolated and responsible for a single mode (vertical structure). Reported responsibilities and activities of the directorates **do not consider intermodally and co-modality or potentially joint services of modes**. Also, the road traffic directorate does not mention intercity public transport operations monitoring etc as a separate activity.

The directorate on international cooperation and IPA funding is the only body, which potentially deals with modes in a horizontal manner. Ministry offices on the other hand deal with horizontal, administrative tasks such as finances, human resources, public procurement and legal affairs.

3.1.1.2 Transport Companies and Entities

The railway sector is well structured, having a company responsible for managing infrastructures and regulating operations (Železnička Infrastruktura Crne Gore (ŽICG)), at least one service provider for passengers (Željeznički prevoz Crne Gore AD) and

freight (Montecargo), and a rolling stock maintenance provider (Održavanje željezničkih voznih sredstava (OŽVS)).

In the air sector, given the size of the country and the fact that air transportation accommodates only international flows, the structure of that subsector is adequate as it involves a civil aviation agency regulating safety, navigation and other operations, an airport company managing the country's two international airports (Airports of Montenegro) and a small size flag carrier (Montenegro Airlines). Adequate process has been observed in introducing bodies on safety in the airport sector.

The maritime sub-sector comprises port authorities, which are managed by the Directorate for Maritime Traffic. There are two Port Authorities (Bar, Kotor) and port branch offices in Ulcinj, Budva, Virpazar, Tivat, Zelenika and Herceg Novi. Only the Port of Bar (Luka Bar) and Adria are managed by autonomous legal entities, although the Luka Bar company is state-owned. The remaining major ports of Kotor and Zelenika are operated by offices directly falling under the jurisdiction of MTNMA.

Bus and freight logistics companies operate under the general rules set by the Chamber of Economy of Montenegro, which is responsible for setting timetables of bus services. For bus services, despite their importance in the country's interurban transportation, there is no dedicated, regulatory authority monitoring and supervising operations of the public interurban bus system. Timetables are prepared by Montenegro's Chamber of Economy, but the process is rather unclear and not described in the country's law of roads.

3.1.1.3 Other Stakeholders

Other stakeholders involved in the transport sector in Montenegro are the **Ministry of Internal Affairs**, with responsibilities on traffic safety, border crossings, emergency, the **Ministry of European Affairs**, which oversees compliance with EU legislation and manages EU funds and the **Ministry of Sustainable Development and Tourism** whose responsibilities involve spatial planning, tourist related policies and environmental protection.

3.1.2 Transport Sector Operations and Services

3.1.2.1 Railway Operations and Services

Passenger railway lines operate 24h per day at daily frequencies of 5 to 11 trains per direction – during summer frequencies are increased in the Bar – Podgorica section of

the railway line. The commercial speeds of Montenegrin passenger trains range between 45 km/h – 48 km/h, which are considerably low; this is attributed to deficient infrastructures, rolling stock limitations, repair works along the line and other, non-technical reasons. Depending upon the rail segment, allowed speeds along railway lines range between 50 km/h and 100 km/h.

Commercial and maximum speeds have a difference of over 30%, which is an indication of a low performance for all rail lines.

The Level of Service (LOS) for railway services (in a nominal scale from A-F) is related to the frequency of services and travel time between destinations. Table 3.1 presents the LOS for Montenegro railway line segments; the country's rail lines exhibit low to average levels of service, which are attributed to reduced commercial speeds and reduced frequencies.

Table 3.1: Level of Service for Montenegro's railways

Segment	Level of Service
Podgorica - Bar	C
Porgorica – Niksic	D
Podgorica – Bijelo Polje	D
Bar – Bijelo Polje	D

3.1.2.2 Public Transport Operations

Interurban public transport in Montenegro is regulated by the Law on Roads; the Chamber of Economy is responsible for licensing carriers and bus depots, for assigning routes, and for setting timetables. Currently interurban bus services are provided by several private carriers (over 100 carriers operate only from the main bus terminal of Podgorica), complying with the Law on Roads. The main bus terminal is located in Podgorica with 300 bus departures per day; buses offer daily connection between the capital and major and smaller cities of the country as well as to international destinations. Podgorica's bus terminal accommodates over 1 million travelers per year.

3.1.2.3 Road Safety

Montenegro has experienced a rapid increase in motorization in the past decade; vehicle ownership rate increased by over 40% between 2005 and 2015 while on the other hand the highway network was (until recently) not upgraded to meet increasing demand for road transport. Unavoidably, this had a negative impact to road safety, at least until 2009. Since 2010, while registered vehicles tend to increase, fatalities degrade. However, for year 2016 the corresponding figure far exceeds EU average. Injuries on the other hand tend to increase even though the total number of accidents has been considerably reduced since 2013. This is probably attributed to the fact that modern and safer vehicles are introduced in the country's fleet while the road environment has remained more or less unchanged.

Road safety is an issue of consideration for Montenegro's transport strategy: while accidents and fatalities are decreasing, corresponding figures are still very high compared to conditions in the EU.

3.1.2.4 Combined & Intermodal Transport

The future of the rail Route 4 and the port of Bar are interconnected. The present difficulties for expanding their reach to international markets stem from the fact that now, as compared to the past, access routes to the markets of Serbia and beyond are subject to competition from both sides of the country, i.e. Albania and Croatia. The ports of Durres and Rijekay and all the existing and developing opportunities for the on-carriage of goods to the final points of production and consumption, pose many challenges to the port facilities of Bar and to Montecargo as well. Therefore, the decision of the Council for Privatisation & Capital Projects of Montenegro to sell stakes in the national freight operator Montecargo together with the port operator Luka Bar was wise. Unfortunately, this selling to the single bidder, Poland's OT Logistics Group was cancelled. According to the terms of the planned agreement, the company was expected to pay €2.5m for a 51% stake in Montecargo and €8.5 for a 30% stake in Luka Bar. It would also commit to investing €17.5m in modernising the two businesses. The business plan envisaged strengthening Montecargo's position in the international logistics market, doubling its traffic and taking a leading position on the Baltic-Adriatic corridor, with a 50% share of the agricultural products market.

3.1.2.5 Border Crossings

During peak tourist seasons, daily average road traffic in border crossings doubles or even triples compared to typical days of the year. This is of importance as tourism is a major industry for Montenegro and border delays imply increased travel times, which do have an impact to that sector of the country's economy. As such, border crossings exhibit delays during peaks since transit times may exceed 4h and queues with lengths of over 1 km may be formed.

Montenegro railways exhibit delays, 40% of which is attributed to border crossing operations. There are several operational sources of delay, which are related to the customs and security procedures as well as the railway administrator at the other side of the border. Talks are under way with Albanian and Serbian rail administrations concerning the border stations at Bijelo Polje and Tuzi respectively. Reconstruction and adaptation of station building in Bijelo Polje is planned to be completed so that it can operate as joint border crossing station, according to the Agreement on border crossing control in railway transport between Montenegro and Republic of Serbia. The Border Crossing Agreement between Albania and Montenegro is sufficiently advanced, as it is signed together with all relevant protocols, albeit the practical enforcement needs yet to take place such as the training of the staff of the border agencies. The station of Tuzi is a joint border crossing station, which reduces the time of train retention in borders for at least 60 minutes.

3.1.3 ITS and Telematics

3.1.3.1 Road Telematics

Directive 2010/40/EU has not been implemented and Montenegro does not have a dedicated ITS strategy. The new law of roads has only recently introduced the legal basis for ITS implementation which will further pave the way for transposition of the EU's aforementioned directive. Currently, ITS has been deployed only in Tunnel Sozina and its access road; equipment and functionalities are in accordance with the relevant EU Directive on tunnels and roads. The tunnel is controlled from the local control center at Gluhi Do. ITS has been planned within the ongoing motorway construction of section Smokovac - Matesevo (Route 4) in total length of 41 km and an estimated cost of €25 million.

3.1.3.1 Railway Telematics

Montenegro has transposed EU's Interoperability Directive in its legislation. However, currently, a dedicated ERTMS strategy or plan for implementation does not exist. TSIs have been mentioned within the interoperability Directive; however, they have not been transposed into national legislation. Current deployment of ERTMS Optic fibre has been installed along the Bar – Podgorica – Bijelo Polje line. Also, in railway station Podgorica ECTS level 1 equipment will be installed.

2.6.11.3 Maritime Transport

Directive 2002/59/EC on establishing a EU vessel traffic monitoring and information system (VTMIS) was fully transposed into Montenegro's legislation; institutional aspect of VTMIS system is covered by the Ministry of Transport and Maritime Affairs. Parts of the Directive 2010/65/EU on the Maritime Single Window system are envisaged to be transposed during 2016. To fully implement the Directive, investments are needed to implement the Maritime Single Window information system.

The first phase of VTMIS was implemented in Montenegro with the support of EU. Sensors were installed on three sites along Montenegrin coast. Data from sensor sites is distributed to the Control Centre, from which, maritime data is been exchanged with other systems in Montenegro and abroad. Costs of implementation of the first phase of VTMIS on Montenegrin coast were €1,8 million. The second phase will include installation of additional CCTV sensors on existing VTMIS locations, new sensor locations in Lake Skader and Boka Bay and the implementation of the "Single Window" information system. Estimated costs for introduction of first two actions amount to €1.6 million and for the third action €500,000.

3.2 Problem Analysis

3.2.1 Main Findings

3.2.1.1 Organizational Aspects

The MTMA keeps a straightforward vertical structure, with directorates devoted to individual travel modes (road infrastructures, road traffic, rail, air, maritime). However, any interlink between these directorates with special reference to co-modality and inter-modality is missing. It appears that there is no responsibility neither on the establishment, operation, and management on intelligent transportation systems nor on sustainable mobility. These two cross-modal aspects of the transportation sector are

currently given limited (if any) importance in the ministry' structure and responsibilities. Also, the road traffic directorate does not mention intercity public transport operations monitoring etc as a separate activity. Several road transport related activities are the responsibility of other ministries, although road traffic operations and infrastructures are supervised and managed by MTMA; no clear interaction exists between different bodies and a joint effort towards managing state road traffic and infrastructures is required.

3.2.1.2 Railway Services

Level of service analysis for railway operations revealed LOS of C and D for all railway lines. This is attributed to both train frequencies and low commercial speeds. Among all lines, the Bar – Podgorica line exhibited the highest LOS. Figure 3.1 shows the LOS status of Montenegro's rail lines with respect to other rail lines in Europe:

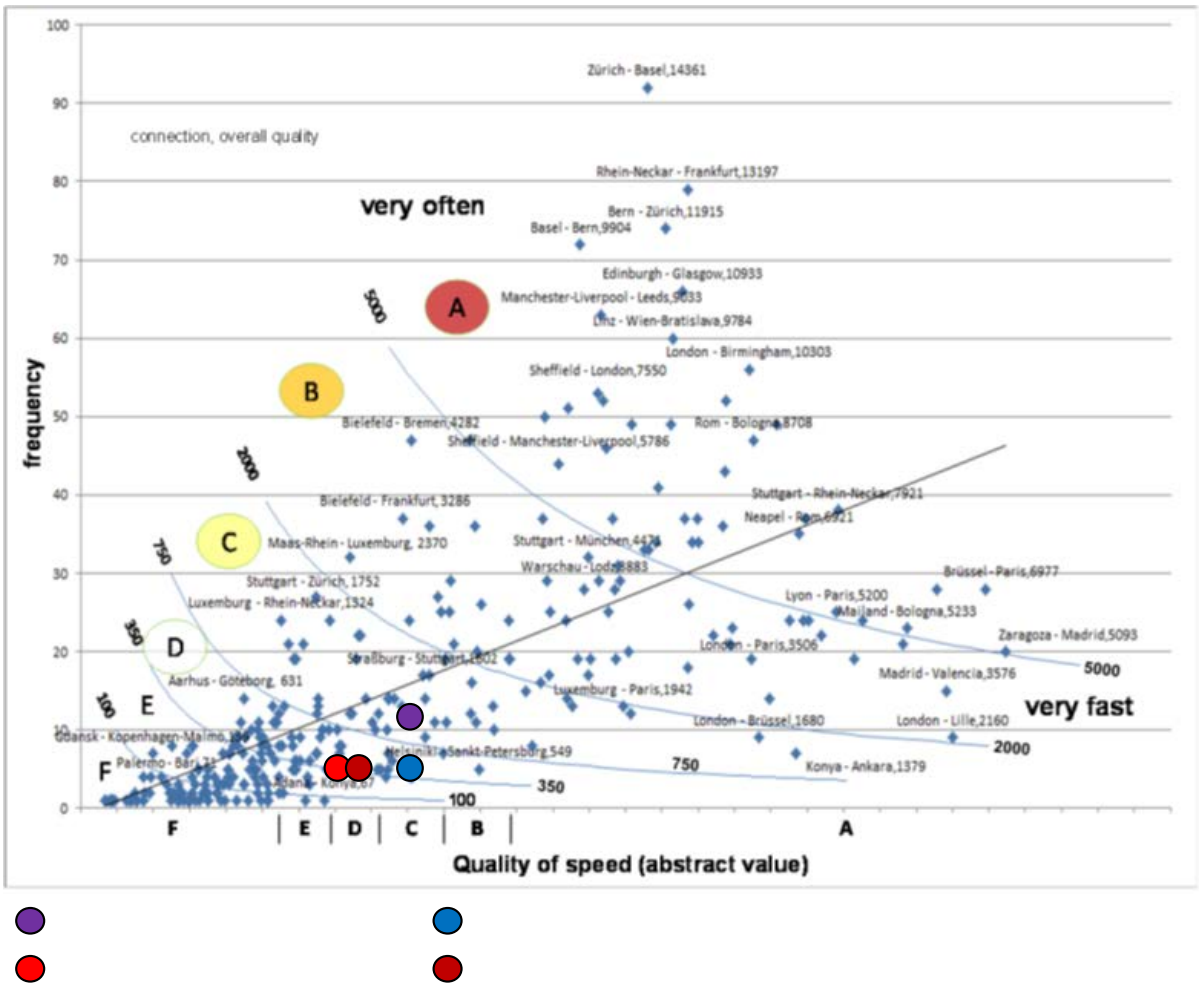

Figure 3.1: LOS status of Monenegrin rail lines compared to other European lines (Source: Lüttmerding and Gather, 2013 and consultant analysis).

Interestingly, while LOS for Montenegrin rail lines is low, it is still better compared to numerous rail services in the EU. Nevertheless, LOS should be improved to recapture lost ridership of the past few years.

3.2.1.3 Transport Safety

Montenegro is not well positioned with respect to EU average with respect to deaths attributed to road accidents (105 fatalities per year in 2015) but close to the maximum value exhibited in the EU (103 fatalities per year in 2015). Furthermore, compared to neighboring countries, the performance of Montenegro is worse. On the other hand, the EU target of reducing deaths in the Union by at least 29%, for the period between 2010 and 2015 has been exceeded, as deaths per 1,000,000 inhabitants in Montenegro have been reduced by 32% during this period.

3.2.1.4 Border Crossing Operations

Road border crossings exhibit clearance delays, especially in the summer months. Indeed, current infrastructures and border procedures do not seem to be able to cope with average daily peaks, while seasonal peaks lead to long waiting queues and clearance times of even several hours. This clearly affects transit times, which are heavily penalized by additional waiting times to clear customs and passport control in Montenegro's border crossings. For railways, as mentioned in chapter 2 of the report, several deficiencies in border operation have been identified as possible causes of border delays.

3.2.1.5 Inter-modality in freight transport

While Montenegro adopted in 2014 a law on intermodality, significant efforts are needed to ensure full alignment with EU legislation. This becomes evident as there are no clear activities on promoting or implementing inter-modality in freight transport. Montecargo offers intermodal freight transportation services, which are limited by the operational capacity of the railway network. An obvious client of Montecargo is the port of Adria for the transport of containers. Currently there are no transport agreements between the two companies, although, reportedly, efforts have been made. Furthermore, the country's existing state road network cannot efficiently handle road freight transport and Montecargo should champion the shift from road to rail and create the necessary conditions for this shift to happen.

3.2.1.6 Interoperability of the railway system

Montenegrin railways offer international services with Serbia through the Bar – Belgrade railway line. With respect to EU operational interoperability, the relevant Directive(s) has been transposed. However, related technical specifications have not been incorporated in the national legislation and no dedicated ERTMS strategy exists. As for technical interoperability, ERTMS Optic fibre has been installed along the Bar – Belgrade corridor's part of Montenegro. Also, in the railway station of Podgorica ECTS level 1 equipment will be installed. However, no major ERTMS project has been reported.

3.2.1.7 Management of the rail sector

Montenegro's rail network is stated to be open to all service providers in a transparent, non-discriminatory manner, as long as they are registered in the country's central registry of the commercial court, they have a valid transport license and a certificate for safe transport issued by the government of Montenegro or by a country having a bilateral agreement with Montenegro). Operators need to be liable and must have a contractual agreement with Montenegro's rail infrastructure manager (ŽICG). Indeed, Montenegro's law on Railways [4] has been transposed to adopt to EU legislation; nevertheless, a local registration of the service provider is needed, and licenses and certificates have to be issued by the country's ministry, following the country's processes and bylaws (no bilateral agreements by other countries or the EU are indicated in the report). These can be viewed as indirect barriers to entering the local market.

Service planning (capacity allocation) is rather straightforward: an annual time plan is devised following requests for train paths by providers with the schedule development and adjustment process being a result of consultation between the rail infrastructure manager and interested providers. Again, capacity is stated to be allocated in a transparent and non-discriminatory manner. However, the railway infrastructure manager (ZICG) seems to preferentially treat existing, already established providers, who can achieve higher utilization for cultural, historical or pricing policy reasons (for example, the local passenger and freight carriers). This is an indirect barrier to entering an already, relatively small market.

[4] Railway Act ("Official Gazette of Montenegro", No. 27/13)

3.2.1.8 Management of ports

The country's major port (Bar) has already been partially privatized (Port of Adria) and the government of Montenegro has been seeking to privatize the remaining part (Luka Bar). Currently, the port of Bar operates significantly below its capacity; a major barrier towards increasing demand for using the port is straightforwardly related to the lack of proper road and rail network supporting freight transportation to and the from the port. The remaining ports are of minor importance for the country's transportation system; the port of Kotor accommodates cruise ships and the port of Zelenika is registered as a freight port but its infrastructures can support only minor volume services.

3.2.1.9 Provisions for the Road Freight sector

Most of the country's inland commodity transport is undertaken by the road freight sector. Recent legislation states that when capacity for passenger or freight transport in the country is inadequate, foreign carriers may be called upon by authorities and become licensed to undertake transport services in Montenegro. Most importantly though, the law proposal states that upon Montenegro's entrance in the EU, road freight cabotage restrictions and barriers will be fully alleviated. ITS dedicated to or facilitating freight vehicle drivers is practically non-existent; road VMS has only been installed in the Sozina tunnel; freight vehicle drivers can only rely on information obtained from mobile internet services (eg Google traffic, Bing Traffic) for obtaining information on traffic, alternative routes and weather conditions. Also, there is an absence of organized rest areas along the country's main network.

3.2.2 Organizational and Operational Objectives

Seven priority areas are identified for Montenegro's transport infrastructures. These are:

- Priority Area 1: Organization of Transport Sector
- Priority Area 2: Transport Investments
- Priority Area 3: Performance of Networks
- Priority Area 4: Financial Sustainability
- Priority Area 5: Management of Rail and Port Services
- Priority Area 6: Intelligent Transportation Systems
- Priority Area 7: Intermodality and Road Freight Transport

Relevant specific objectives, targeting into transport infrastructures are presented in Table 3.2:

Table 3.2: Specific objectives targeting on transport organization and operations

#	**Objective**	**Expected Outcomes**
Priority Area 1: Organization of Transport Sector		
1.1	Create coordination conditions between transport stakeholders	• Involvement of all stakeholders In decision making. • Communication between stakeholders • Holistic monitoring and view of progress and needs for the transport sector. • Efficient governance and decision-making, based on comprehensive view of needs and solution proposal.
1.2	Update governance structure and bodies	• Improve performance of government bodies • Establishment of bodies focusing on ITS, interuban public transport and combined-intermodal transport. • Establishment of research institute with focus on transportation.
1.3	Re-organize governance responsibilities	• Sub-sectoral (mode) responsibilities in the government level aggregated to a single body. • Align responsibilities with TDS strategy
1.4	Privatize transport stakeholders	• Privatization of the port of Bar and Montenegro Airports.
Priority Area 2: Transport Investments		

#	Objective	Expected Outcomes
2.2	Secure a good governance and management structure across the whole life cycle of motorways.	• Operation and maintenance of core networks satisfying the mobility needs of Montenegro in a safe, sustainable and competitive manner • Optimal maintenance programming and allocation of resources.
Priority Area 3: Performance of Networks		
3.1	Maintain adequate LOS of state road network	• Road network of good condition • Upgraded geometric characteristics • Increased speeds and reduced travel times • Reliability in travel times • Safe road environment • Better accessibility
3.2	Improve traffic safety	• Reduced number of accidents in state network • Reduced number of road accident fatalities and injuries
3.4	Upgrade rail services	• Adequate service frequency • Timetable reliability • Increase in traveler share and ridership
3.6	Reduce border clearance times	• Lower access and transit times for passenger and freight movements.
Priority Area 4: Financial Sustainability		
4.1	Secure alternative funding sources for transport investments	• Participation of the private sector in transport investments.
4.2	Improve programming and allocation of funds	• Efficiency in project selection • Consistency with budget capability
4.3	Achieve efficiency in operations and maintenance	• Sustainability in road and rail maintenance financing

#	Objective	Expected Outcomes
	expenditures and budget allocation	• Reduced subsidies for the transport sector
Priority Area 5: Management of Rail and Port Services		
5.1	Alleviate barriers in rail services	• Open railway market • Lower fares and tarrifs • Improved services
5.2	Improve connectivity in port of Bar	• Increased freight flows • Improved port competitiveness • Full privatization of the port of Bar
Priority Area 6: Intelligent Transportation Systems		
6.1	Deployment of ITS technologies in the road, rail and maritime sectors	• Upgraded services to users and travelers • Advanced monitoring and management of network operations. • Performance and safety improvement in networks
Priority Area 7: Intermodality and Freight Transport		
7.1	Reinforce the creation of an efficient and integrated transport system through intermodality	• An efficient transport system, integrated in the region and in the EU network, which promotes economic development and the citizens quality of life • Create favourable conditions for the intermodal and combined transport and logistics • Attract investments • Reduce rail transit times and transport costs • Establish joint border crossings • Reduce logistics costs
7.2	Enhance support for road freight transport	• Establishment of facilities and services to road freight operators

3.3 Proposed Measures

Proposed organizational and operational measures are identified for each of the specific objectives. These are as follows:

3.3.1 Priority Area 1: Organization of Transport Sector

Priority area 1 measures focus on improving governance of the transport sector by promoting coordination, restructuring governmental bodies and reorganizing responsibilities (objectives 1.1, 1.2, 1.3). The following measure are identified for that purpose:

- **Expansion of e-governance**
- **Development of a monitoring and data collection system in transport sector**
- **Transposition of remaining EU legislation and completion of bylaws**
- **Creation of dedicated bodies for intermodality, ITS and interurban public transport**
- **Aggregation of responsibilities in one ministry**
- **Creation of agency dedicated to private sector involvement in transport.**
- **Improvement of private sector involvement related legislation.**
- **Privatization of Montenegro Airlines**
- **Development of Concession scheme for Airports of Montenegro**

In detail, e-governance will support faster and cost-efficient processes in decision making while on the other hand allow for transparency and accountability. A monitoring and data collection system is necessary for evaluating conditions in the country's transport sector and for planning and proposing future courses of action and allocation of resources. Dedicated bodies for critical elements of the transport sector (ITS, intemodality, interurban public transport) are missing; establishment of such bodies is necessary for achieving progress in elements required for EU integration. Dispersion of responsibilities between ministries hinders efficient management of the transport sector, since additional coordination and decision making in the higher level is required.

Therefore, aggregation of responsibilities in a single ministry (MTMA) would improve governance of the transport sector, allocation of resources and budget etc.

The participation of the private sector in Montenegro's transport sector is first and foremost anticipated to occur in the form of concessions, either for developing new infrastructures or for upgrading / exploiting existing ones. Facilitation of relevant processes requires a dedicated body for that purpose, manned with experts in the fields of transportation related concessions and investments. In the same context, legislation on private sector participation in the development of transport infrastructure and in the provision of transport services (such as laws on road and rail transport) should be fully aligned with EU requirements.

Finally, Montenegro Airlines and Airports of Montenegro are state companies whose restructuring and possible private sector involvement would allow for new funds and further upgrade of provided services.

3.3.2 Priority Area 2: Transport Investments

Good governance and management of new infrastructures in their whole life cycle (objective 2.2) is required. In this case, corresponding operational and organizational measures include:

- **Efficient SPP progress monitoring**
- **Establishment of a regulatory body for motorways**
- **Introduction of Total Quality Management in transportation systems and services.**
- **Personnel training in transport infrastructure management**

A body dedicated to SPP has already been established by the government of Montenegro; this body should be sufficiently manned and equipped so that progress of transport infrastructures in the single project pipeline is monitored, evaluated and preventive / corrective courses of actions are taken when and where necessary. A regulatory authority for motorways would be required to handle issues such as toll levels and interoperability, monitoring of motorway operations, motorway compliance with EU regulations etc.

Total quality management should be introduced in the management of new and existing transport systems and services (especially those managed by the public sector). Efforts

should be made on monitoring and continuous improvement of performance and services, having traveler satisfaction as the key objective. In the same context, personnel should be trained to follow such practices.

3.3.3 Priority Area 3: Performance of Networks

Priority area 3 measures refer to all organizational and operational actions required for improving and/or maintaining performance and level of service for roads, railways and other transport infrastructures.

With respect to the road sector, such measures are:

- **Develop strategic plan for road safety**
- **Plan Road Safety Inspection and Road Safety Audit Activities**
- **Improve road safety surveillance and traffic law enforcement**
- **Develop / upgrade Emergency Response Services (EMS)**
- **Establish border processes in cooperation with neighbors.**
- **Plan and operate efficient and passenger friendly interurban public transport operations and services**

Montenegro should develop a strategic plan for improving road safety, which will set the policy, targets and measures for that purpose. In the same context, road safety inspections and audits should be planned and undertaken to identify black spots and other, potentially dangerous sections in the country's road network. Traffic surveillance and law enforcement should be enhanced to enhance driver compliance with traffic law and reduce traffic violations; these should be done by policing and technical means (speed monitoring equipment, traffic cameras etc). Also, emergency response services should be upgraded and be able to efficiently undertake the aftermath of incidents and allow for faster recovery and restoration of regular traffic operations.

Interurban public transportation operations and services are scattered and seem to lack schedule coordination and information provision, especially with respect to transfers between bus lines, as well as multi-modal transportation. Planning of operations should focus on achieving an integrated provision of services between origins and final destinations in the country, rather than individual trip legs between bus stations. Fare purchase and centralized information provision through the internet are also necessary.

As for rail operations and services, the following measures are proposed:

- **Improve operations (frequencies, travel times etc)**
- **Create multimodal services & new fare policy**
- **Promote rail as a sustainable service.**

First and foremost, rail passenger operations should be improved in terms of frequencies and travel times to attract travelers; this is of course related to the condition of infrastructures and signaling, which are in the process of being overhauled. Punctuality of itineraries should be kept to an appropriate level and frequency of services should be at least retained and/or enhanced. In the same context, multimodal services (such as buses and taxis) and smart (promotional) fare policies would attract additional travelers to the country's rail network. Last, rail should be promoted to travelers as an attractive sustainable alternative to private vehicles.

3.3.4 Priority Area 4: Financial Sustainability

Introduction of alternative funding sources, improvement of project programming and fund allocation and efficiency on operations and maintenance are major objectives in the context of financial sustainability. Corresponding operational and organizational measures for that purpose include:

- **Introduction of new funding sources and market players, mainly in the form of concessions.**
- **Development of asset management systems.**
- **Establishment of travel demand management practices.**
- **Promotion of alternative fuels and electromobility.**
- **Promotion of road transport fleet replacement / upgrade.**
- **Creation of competitive maritime connections**

Given the size of Montenegro's economy, public funding for new projects is scarce, while any new loads will have a negative impact in the country's public debt (which will exceed viability limits). On the other hand, donations from the EU cannot cope with financing requirements for projects set in the Single Project Pipeline. As such, participation of the private sector (in the form of concessions) in new projects and existing services is required for securing funds and completing transport investment.

Transportation asset management systems should be implemented in all transport sector infrastructures (existing and new), to align and coordinate management and investment strategies of transport infrastructures and services with user expectations, transportation system conditions and performance, and availability of resources.

Table 3.3: Attributes of Asset Management Systems[5]

Attribute	Description
Policy-driven	Resource allocation decisions are based on a well-defined set of policy goals and objectives.
Performance-based	Policy objectives are translated into system performance measures that are used for both day-to-day and strategic management.
Analysis of Options and Tradeoffs	Decisions on how to allocate funds within and across different types of investments (e.g., preventive maintenance versus rehabilitation, pavements versus bridges) are based on an analysis of how different allocations will impact achievement of relevant policy objectives.
Decisions Based on Quality Information	The merits of different options with respect to an agency's policy goals are evaluated using credible and current data.
Monitoring Provides Clear Accountability and Feedback	Performance results are monitored and reported for both impacts and effectiveness.

Travel demand management strategies will allow for a modal shift and spatial and time re-distribution of travel patterns in the country's network, and therefore improve capacity and efficiency, especially during summer peaks. Such strategies could include road pricing, car sharing and ridesharing initiatives, promotion and incentives for using rail and public transport. Implementation of travel demand management strategies will yield

[5] NCHRP Report 551, *Performance Measures and Targets for Transportation Asset Management, Vol. I, Research Report*, 2006, p. ii.

additional economic, environmental, fuel consumption and public health benefits to the county's inhabitants.

Electromobility and alternative fuel are becoming increasingly important in the EU's transport sector, in an effort to disengage from fossil fuel dependency and adverse environmental impacts. Montenegro should promote initiatives, studies and private sector involvement in the introduction of electromobility in the country, in the future years. In the same line, replacement and upgrade of the country's vehicle fleet should be targeted to meet EU conditions.

Finally, given that the port of Bar currently offers only limited passenger ferry connections (with Italy), establishment of new maritime lines to other ports in the Adriatic and the Ionian seas may be considered, at least up until the completion of the Adriatic – Ionian motorway to its full extent.

3.3.5 Priority Area 5: Management of Rail and Port Services

Priority Area 5 measures refer to activities for alleviating any barriers to entering the rail market and for improving connectivity and operations of the port of Bar. Related operational and organizational measures include:

- **Full transposition of EU legislation**
- **Facilitation of the introduction of new market players in rail services**
- **Further privatization of port services.**

As discussed, there are organizational and operational barriers to entering the rail market in Montenegro; these should be alleviated by (a) transposing EU legislation and (b) restructuring licensing and capacity allocation processes in the rail sector. Privatization of the remaining part of the port of Bar should also be considered.

3.3.6 Priority Area 6: Intelligent Transportation Systems

Deployment of ITS systems and technologies in Montenegro's core network is required for EU integration. Necessary, operational and organizational measures for that purpose are the following:

- **Full transposition of EU legislation.**
- **Creation of ITS strategy for Montenegro.**
- **Preparation of studies for ITS development and implementation.**

- **Seek financing sources for ITS.**

Apart from full transposition with EU legislation, Montenegro should create a focused strategy on implementing, managing, funding and monitoring ITS in the country, in the forthcoming years. This implies that additional, focus studies should be prepared for further ITS development and implementation, while financing sources will be required for that purpose.

3.3.7 Priority Area 7: Intermodality and Road Freight Transport

Priority Area 7 measures aim at promoting intermodality and improving road freight transport. Related operational and organizational measures include:

- **Promote and support intermodal agreements.**
- **Introduce ITS services targeting to road freight transport.**
- **Improve customs operations in border crossings**

From an organization perspective, intermodality can be achieved only if agreements between participating parties (port managers, railway carriers, road freight carriers, intermodal stations) are established; the government of Montenegro should support and promote such agreements, especially when state-owned companies are involved.

While the cabotage on road freight transport was almost fully removed by recent legislation, there are several operational aspects that should be considered. First, ITS targeted to road freight transport must be deployed, in accordance to the ITS strategy and measures discussed in priority area 6. Also, custom operations and processes should be enhanced to reduce transit times for road freight transport entering and exiting Montenegro.

3.3.8 Summary of Organizational and Operational Measures

Table 3.9 summarizes measures per transport sub-sector and objectives addressed:

Table 2.9: Summary of organizational and operational measures

Objective	Organizational and operational measures
Create coordination conditions between transport stakeholders	• Expansion of e-governance • Development of a monitoring and data collection system in transport sector • Transposition of remaining EU legislation and completion of bylaws • Creation of dedicated bodies for intermodality, ITS and interurban public transport • Aggregation of responsibilities in one ministry
Update governance structure and bodies	
Re-organize governance responsibilities	

Objective	Organizational and operational measures
	• Creation agency for private sector involvement in transport. • Improvement of private sector involvement related legislation.
Privatize transport stakeholders	• Privatization of Montenegro Airlines • Development of Concession scheme for Airports of Montenegro.
Secure a good governance and management structure across the whole life cycle of motorways.	• SPP progress monitoring • Establishment of a regulatory body for motorways • Introduction of Total Quality Management in transportation systems and services. • Personnel training in transport infrastructure management
Maintain adequate LOS of state road network	• Develop strategic plan for road safety • Plan Road Safety Inspection and Road Safety Audit Activities • Develop / upgrade Emergency Response Services (EMS) • Plan and operate efficient and passenger friendly interurban public transport operations and services • Improve road safety surveillance and traffic law enforcement
Improve traffic safety	
Upgrade rail services	• Improvement of operations (frequencies, travel times etc) • Creation of multimodal services & new fare policy • Promotion of rail as a sustainable service.
Reduce border clearance times	• Establish border processes in cooperation with neighbors.
Secure alternative funding sources for transport investments	• Introduction of new funding sources and market players, mainly in the form of concessions.
Improve programming and allocation of funds	• Development of asset management systems.
Achieve efficiency in operations and maintenance expenditures and budget allocation	• Establishment of travel demand management practices. • Promotion of alternative fuels and electromobility. • Promotion of road transport fleet replacement / upgrade. • Creation of competitive maritime connections
Alleviate barriers in rail services	• Full transposition of EU legislation • Facilitation of the introduction of new market players in rail services
Improve connectivity in port of Bar	• Further privatization of port services.
Deployment of ITS technologies in the road, rail and maritime sectors	• Full transposition of EU legislation. • Creation of ITS strategy for Montenegro. • Preparation of studies for ITS development and implementation. • Seek financing sources for ITS.
Reinforce the creation of an efficient and integrated transport system through inter-modality	• Promote and support intermodal agreements
Enhance support for road freight transport	• Introduce ITS services targeting to road freight transport. • Improve customs operations in border crossings

4. The Strategy

This chapter offers a comprehensive overview of the TDS impact with respect to high-level objectives and set the implementation plan of the strategy for periods 2019-2024 and 2025-2035.

4.1 Impact of the Strategy

The overall strategy is developed in such a way so that it aligns to the high-level objectives set: Economic Welfare, Safety and Security, Accessibility, Performance of Operations and Quality of Services, Environmental Sustainability and EU Integration. It is noted that among these high-level objectives, “Environmental Sustainability” is discussed in detail in the TDS Strategic Environmental Assessment. Hence, no further impacts on this specific objective will be presented herein.

Economic welfare is first and foremost promoted by successfully and timely completing new transport investments, alongside with rehabilitating and upgrading existing transport infrastructures. Indeed, new and upgraded infrastructures can and will support further economic growth and prosperity of Montenegro in the future, by improving accessibility, travel time, and comfort in transportation of people and goods, while on the other hand reducing travel costs. However, it should be stressed that high costs for developing and rehabilitating transport infrastructures could have adverse impacts to the country’s public finances and economy, and could eventually hinder growth. This is especially true if traditional funding schemes (loans) are to be followed. As such, instruments such as concessions or public-private partnerships are required for financing these projects. Organizational measures such as dedicated bodies, e-governance and asset management can contribute in better governance and management of the transport sector, transparency, accountability and better allocation of budget and resources. Alleviation of market barriers in the rail sector, improvement of border crossing operations, deployment of ITS systems, promotion of intermodality and measures on road freight transport can facilitate economic activities. Finally, measures targeting on private sector participation in developing transport infrastructures and undertaking services can yield new funding sources and create new investments and employment positions, which can further stimulate economic growth of Montenegro.

Safety and Security is also supported by timely and successfully introducing modern transport infrastructures. combined with upgrading existing ones. Indeed, the proposed

investments in the SPP, along with planned and proposed improvements in the country's state network can radically improve the current road and rail environment, with clear gains in traffic safety. Measures targeting on efficient management of infrastructures (asset management) can improve maintenance effectiveness of infrastructures and therefore aid in retaining transport infrastructures in a good state. Alongside, the introduction of ITS contributes to a safer and more secure transportation environment for road, rail and maritime operations. Finally, proactive and reactive, core traffic safety related measures such as the development of strategic plans for road safety, road safety inspections and audits, improved traffic surveillance, law enforcement and emergency response services are prerequisites for improving traffic safety and securing in Montenegro

Accessibility, Performance of Operations and Quality of Services is achieved by measures targeting on enhancing road and rail capacity, operations and services. Infrastructural measures mostly aim at increasing the capacity and level-of-service of the road and rail networks; this implies higher speeds and lower travel times. Operational measures such as the introduction of travel demand management strategies and the development of ITS systems allow for a more efficient use of transportation networks. Connectivity and accessibility are further supported by improving interurban public transport services, by proposing new maritime connections, by enhancing border crossing operations, and by promoting multimodality in passenger transport.

As for **EU integration**, all proposed measures are in line with EU directives and requirements. Full transposition of EU legislation is suggested in the TDS where necessary. Organizational Measures on ITS implementation, intermodality, market opening, travel demand management, electromobility and private sector participation in the form of concessions are among those areas in the transportation sector, being at the core of EU policies and practice.

4.2 Implementation Plan

The TDS implementation plan includes a schedule of actions, along with a financial plan and risks to implementation. The plan is divided into two periods (action plan 2019-2024 and action plan 2025-2034); for each period, measures, indicators and budget requirements are discussed.

4.2.1 Infrastructural Measures

Measures on infrastructures and associated budgetary needs for each action plan are presented in Tables 4.1 and 4.2:

Table 4.1: Action Plan of Infrastructure Measures 2019-2024

Measure	Infrastructure Projects	Cost (€)
• Program single pipeline projects for target years 2025 and 2035. • Continue and intensify actions towards project completion. • Align project activities and programming with those of neighboring countries	**SPP Projects:** ▪ Reconstruction of the Šćepan Polje-Plužine highway (border crossing with Bosnia and Hercegovina) ▪ Motorway Bar-Boljare, section Mateševo – Andrijevica ▪ Motorway Bar-Boljare, section Andrijevica – Boljare ▪ Adriatic Motorway, Bypass Tivat ▪ Adriatic Motorway, Bypass Budva ▪ Adriatic Motorway, Section Tivat-Sozina	60.0M 294.8M 731.2M 56.5M 158.4M 198.5M
	SPP Projects: ▪ Reconstruction and modernization of the railway line “Vrbnica-Bar", state border with Serbia	178.0M
	SPP Projects: ▪ Development of Podgorica Airport ▪ Development of Tivat Airport	94.8M 55.0M
• Complete planned road reconstruction projects (2017-2019)	▪ See Appendix A.1	
• Reconstruct state road sections with state borders to Kosovo and B&H.	▪ Reconstruction of the Pluzine-Niksic highway ▪ Reconstruction of the Danilovgrad – Niksic highway	60.0M 35.0M
• Upgrade roads to recreational areas (ski and coastal resorts).	▪ To be defined in a later stage	N/A
• Improve signage and road furniture of main roads	▪ All state roads	0.5M
• Expand service length of selected rail stations to 740 m • Introduce ERTMS in rail network. • Improve rail connection segments to port of Bar	▪ Reconstruction and modernization of the railway line “Vrbnica-Bar", state border with Serbia	Included in reconstruction costs
• Purchase passenger and freight rolling stock	▪ All railway lines	10M €
• Add booths in road border crossings	▪ Candidate border crossings of Bozaj, Sukobin (Albania), Debeli Brijeg (Croatia), Sitnica (Bosnia & Herzegovina), Rance, Dracenovac, Dobrakovo (Serbia)	5M €

• Completion of Vessel Traffic Management Information System (VTMIS) (phase II)		4M €
	Total Estimated Costs	**1.74B €**

Table 4.2: Action Plan of Infrastructure Measures 2025-2035

Measure	Infrastructure Projects	Cost (€)
• Program single pipeline projects for target years 2025 and 2035. • Continue and intensify actions towards project completion. • Align project activities and programming with those of neighboring countries	**SPP Projects:** ▪ Adriatic Motorway, section Border with Croatia - Bijela (Bypass Herceg Novi & Herceg Novi-Bijela) ▪ Adriatic Motorway, section Bar – Border with Albania. ▪ Adriatic Motorway, Bypass Bar ▪ Motorway Bar-Boljare, bypass Podgorica, section Smokovac – Tološi - Farmaci ▪ Motorway Bar-Boljare, section Đurmani – Farmaci	193M 150.5M 188M 233M
	SPP Projects: ▪ Reconstruction and modernization of the railway line Podgorica - Tuzi – across the border with Albania ▪ Construction of the railway Nikšić- border with BiH – Trebinje - Čapljina	35M 180M
• Reconstruct state road sections with state borders to Kosovo and B&H.	▪ Reconstruction of the Niksic – Vilusi highway ▪ Reconstruction of the Andrievica – Vuce – Border with Kosovo highway	35M 35M
• Revitalize Berane airport	▪ Berane Airport	20M €
• Expand piers and passenger terminal	▪ Port of Bar (Luka Bar)	N/A
• Installation of ITS equipment in the road network (variable message signs, dynamic signage etc).	▪ Core Network ▪ Comprehensive Network	Included in motorway costs
• Installation of weight-in-motion stations	▪ Core Network ▪ Comprehensive Network	Included in motorway costs
• Establishment of an integrated system for monitoring and information provision of interurban public transport.	▪ Interurban public transport system	1M €
• Develop intermodal stations in Podgorica and Bijelo Polje	▪ Podgorica ▪ Bijelo Polje	6M €
• Develop rest and service areas in main roads	▪ 10 locations in comprehensive network.	5M
	Total Estimated Costs	**1.08B**

4.2.2 Organizational and Operational Measures

Organizational and operational measures, along with associated budgetary needs for each action plan are presented in Tables 4.3 and 4.4:

Table 4.3: Action Plan of Organizational and Operational Measures 2019-2024

Organizational and operational measures	Costs (€)
Expansion of E-governance	5M
Transposition of remaining EU legislation and completion of bylaws	N/A
Creation of dedicated bodies for intermodality, ITS and interurban public transport	N/A
Creation agency for private sector involvement in transport.	0.5M
Improvement of private sector involvement related legislation.	N/A
Privatization of Montenegro Airlines	0.1M
Development of Concession scheme for Airports of Montenegro.	0.1M
SPP progress monitoring	N/A
Develop strategic plan for road safety	0.1M
Plan Road Safety Inspection and Road Safety Audit Activities	1M
Develop / upgrade Emergency Response Services (EMS)	N/A
Plan and operate efficient and passenger friendly interurban public transport operations and services	0.5M
Improve road safety surveillance and traffic law enforcement	N/A
Improvement of operations (frequencies, travel times etc)	N/A
Promotion of rail as a sustainable service.	0.5M
Establish border processes in cooperation with neighbors.	N/A
Introduction of new funding sources and market players, mainly in the form of concessions.	N/A
Creation of competitive maritime connections	N/A
Full transposition of EU legislation	N/A
Facilitation of the introduction of new market players in rail services	N/A
Further privatization of port services.	0.1M
Full transposition of EU legislation on ITS.	N/A
Creation of ITS strategy for Montenegro.	0.1M
Preparation of studies for ITS development and implementation.	0.2M
Seek financing sources for ITS.	N/A
Promote and support intermodal agreements	N/A
Improve customs operations in border crossings	0.2M
Total Estimated Costs	**8.4M**

Table 4.4: Action Plan of Organizational and Operational Measures 2025-2035

Organizational and operational measures	Costs (€)
Aggregation of responsibilities in one ministry	N/A
Establishment of a regulatory body for motorways	200K
Introduction of Total Quality Management in transportation systems and services.	N/A
Personnel training in transport infrastructure management	50K
Creation of multimodal services & new fare policy	N/A
Development of asset management systems.	100K
Establishment of travel demand management practices.	100K
Introduce ITS services targeting to road freight transport.	200K
Promotion of alternative fuels and electromobility.	N/A
Development of a monitoring and data collection system in transport sector	2M
Promotion of road transport fleet replacement / upgrade.	5M
Total Estimated Costs	**7.75M**

4.2.3 Financial Plan

Infrastructure related measures will require about 1.7B € up to year 2024 and 1.1B € up to year 2035. Given the country's GDP projections, its GDP will expand from 3.6B € in 2016 to roughly 4.9B € in 2024 and 6.4B € in 2035 (constant prices); GDP expenditures for regular needs of the transport sector will be approximately 400M for the period between 2019 and 2024 and 800M € for the period between 2025 and 2035. Costs for major infrastructural projects obviously cannot be handled by the country's economy, as their expenditures correspond on average to 3%-5% of the country's annual GDP; in cases of loans, these could further increase Montenegro's debt by at least 50-60% in the future years. As such, external funding in the form of concessions will be necessary for completing most infrastructure projects included in the SPP. For the remaining infrastructure projects, approximately 110M € and 100M €will be required for each period; these will can be supported by loans up to 85%, while another 15% will be provided by the state budget. The Berane airport project and intermodal stations are exceptions, for which exceptions are necessary. Organizational measures have an estimated cost of 8.4M for the period between 2019 and 2024 and 7.8M for the period between 2025 and 2035; these can be possibly covered by the state budget. These are summarized in Table 4.5:

Table 4.5: Financial plan and funding sources for Action Plan 2019-2024

Measure Type	Projects	Costs	Source
Infrastructure measures	SPP projects	1.8B €	Concession
	Railway Rolling Stock	10M €	Concession
	Other Infrastructure Projects	110M €	85% loans, 15% state budget
Organizational measures		8.4M €	State Budge

Table 4.6: Financial plan and funding sources for Action Plan 2025-2035

Measure Type	Projects	Costs	Source
Infrastructure measures	SPP projects	980M €	Concessions
	Berane Airport Intermodal stations	20M € 6M€	Concessions
	Other Projects	76M	85% loans, 15% state budget
Organizational measures		7.8M €	State Budge

4.2.4 Risks

Transport decisions have often been narrowly focused only on the quality of vehicle or other modes of transport facilitation of movement. The impacts of transport decisions are obviously much broader, and improving the flow passenger or freight may even have negative effects on the environment, safety, equity etc. To reduce the risk of conflicting trends or policies, indicators of sustainable transport impacts should

therefore include environmental, social and economic indicators which should be incorporated in the decision process of MTMA.

This provides further opportunities to integrate environmental performance with transport decision making. Those opportunities appear to be restrained by several factors. First there are no direct legal requirements to link agency or departmental performance results to budget allocations. Secondly, widespread inaccuracies or inconsistencies in performance information apparently make it risky to use it in a ’strong’ or ‘punitive’ fashion. Thirdly there seems to be disconnects in the political process, where transport performance information at this point appears to receive limited attention.

The chance of further environmental integration within the transport decision framework therefore appears to depend on a number of factors. Among the major factors could be the government’s adoption of further mandated environmental policy goals, the continuous provision of relevant and reliable data, the structure of political negotiations over funding, the strength of external pressures, and the level of (voluntary or forced) interagency coordination.

Appendix A: Road Sector

A.1 Ongoing and Planned Road Reconstruction Projects

Table A.1: State road reconstruction projects in progress

#	Project	Project cost
1	Reconstruction of the Podgorica-Cetinje road, reconstruction of the Mekavac tunnel, length: 198 m incl Tunnel widening from two to three lanes.	€2 mil. (Budget)
2	Reconstruction of the road Cetinje – Njeguši, length: 20 km.	€9.55 mil. (Budget)
3	Reconstruction of the regional road Slijepač Most - Pljevlja, section Crkvice – Vrulja, length: 12 km.	€4.7 mil. (Budget)
4	Construction of part on the main road Podgorica - Petrovac, section from the roundabout at Golubovci Airport to the roundabout of the Golubovci bypass, length: 2.2 km.	€ 3.6 mil. (Budget)
5	Reconstruction of Vilusi - Vraćenovići road - border of BiH, length: 12 km.	€3.6 mil. (Budget)
6	Reconstruction of the main road Podgorica - Cetinje - Budva, locality Ulići-Ugnji, length: 5.9 km.	€2.9 mil. (Budget)
7	Reconstruction - construction of 3 lanes on the main road Cetinje - Budva, location Ugni, length: 1.4 km.	€1.4 mil. (Budget)
8	Reconstruction of the main road Cetinje - Budva, locality Brajići – Lapcici, length: 5.3 km with a third lane 500 m long and a tunnel 180 m long.	€7.6 mil. (Budget)
9	Reconstruction of the main road Cetinje - Budva, location Kosljun – Zavala, length: 1.8 km.	€1 mil. (Budget)
10	Reconstruction of Berane - Petnjica, entrance to Petnjica, length: 3.6 km.	€3.7 mil. (Budget)
11	Bypass of Rožaje, second phase, length: 2.2 km. Construction of two tunnels, length: 1.6 km and two bridges.	€20 mil. (EIB loan and budget)
12	Reconstruction of the Ilino Brdo - Vilusi road, length: 5,8 km and construction of a third lane, length: 700 m.	€1.6 mil. (Budget)
13	Reconstruction of the road Ulcinj – Krute, length: 13 km.	€7.5 mil. (EIB loan and Budget)
14	Reconstruction of the Berane - Kolašin road, Lubnica - Jezerina section, length: 15 km. and construction of a 3 km long tunnel.	€34 mil. (EBRD loan and Budget)
15	Reconstruction and construction of third lane on the main road Mojkovac - Bijelo Polje, Lepenac – Stevanovac, length: 3.6 km.	€4 mil. (EIB loan and Budget)
16	Reconstruction of the main road Ribarevina - Bijelo Polje, length: 3.1 km.	€2.3 mil (Budget).

Table A.2: Planned state road reconstruction projects for the period 2017 - 2019

#	Project	Project cost
1	Reconstruction of the Berane – Petnjica road, second phase from Berane to the entrance to Petnjica, length: 11.4 km.	€5.5 mil. (Budget)
2	Reconstruction of Pljevlja – Metaljka road, first phase, length: 20 km.	€6 mil. (Budget)
3	Reconstruction of the regional road Krstac - Ivanova Korita, length: 6 km.	€3.5 mil. (Budget)
4	Construction of the Vrulja - Mijakovici road, length: 6 km.	€5 mil. (Budget)
5	Reconstruction of the Pljevlja-Mihajlovica road, length: 12 km.	€3.5 mil. (EIB loan)
6	Reconstruction of the road Barski - Bijelo Polje, Barski - Dobrakovo border crossing, length: 4.1 km, construction of a third lane of 1700 m.	€2.1 mil. (Credit, EIB)
7	Reconstruction of the Barski - Bijelo Polje road, Dobrakovo – Bijelo Polje locality, length: 12.3 km, construction of a third lane of 1500 m.	€3.3 mil. (Credit, EIB)
8	Reconstruction of the road Danilovgrad – Podgorica, length: 15.5 km.	€16.7 mil. (EBRD loan and Budget)
9	Reconstruction of the Tivat - Jaz road, length: 16 km.	€19.2 mil. (EBRD loan and Budget)
10	Reconstruction of the road Rožaje – Špiljani, length: 20 km.	€12 mil. (EBRD loan and Budget)
11	Reconstruction of the Mojkovac-Ribarevina road, section Lepenac-Ribarevine, length: 12,9 km.	€5.5 mil. (EIB loan Budget)
12	Reconstruction of the main road Rozaje - Berane – Ribarevine, length: 57.8 km. Reconstruction will be performed in 4 sections.	€30.4 mil. (EIB loan and Budget).
13	Reconstruction of the main road Budva - Bar, section Kamenovo – Petrovac, length: 11.3 km.	€3.5 mil. (EIB loan and Budget).
14	Reconstruction of the main road Petrovac – Bar, length: 12 km.	€6.8 mil. (EIB loan and Budget).

A.2 Base and Future ("Do-minimum") Road Networks

Figure A.2.1: Base Network (road network in **black**, rail network in **blue**)

Figure A.2.2 Future do-minimum network for years 2025 and 2035 (new road projects indicated in **red** and new railway segments in **violet**)

Appendix B: Rail Sector

B.1 Completed and Ongoing Rail Infrastructure Projects

Table B.1: Railway projects funded by loads.

Item	Period	Funding Source	Amount (€)	Description
Niksic – Podgorica line				
1	2008-2013	*ČEB*	4,978,101.65*	Electrification of Niksic- Ostrog section
2	2008-2013	*ČEB*	1,435,368.67*	Repair and electrification of Niksic-Podgorica line
3	2008-2013	*EBRD*	15,000,000.00	10 tunnels Niksic – Podgorica line 20 road crossings Retaining walls, beams Niksic-Davilovgrad section Rehab of 2 landslides
		TOTAL	**65,000,000.00**	
Vrbnica –Bar line				
1	2008-2013	*EBRD*	4,000,000.00	Reconstruction of the Ostrovica tunnel
2	2008-2013	*EBRD*	10,000,000.00	Overhaul of Kolasin-Kos section Rehab of 3 tunnels on the Kos-Trebesica section
3	2008-2013	*EIB II*	7,000,000.00	Rehab of 16 steel bridges Project documentation Supervision
		TOTAL	**21,000,000.00**	

*Parts of a €50 mil loan from *ČEB for the period between 2006-2013*

Table B.2: Railway projects funded by pre-accession assistance

Item	Period	Funding Source	Amount (€)	Description
Vrbnica –Bar line				
1	2008- 2013	*ČEB*	804,250.71	Project documentation Supervision
2	2008-2013	*IPA 07, 09, 10*	10,999,000.00	Overhaul of sections: Trebaljevo-Kolasin, Mjatovo Kolo- Mojkovac Project documentation
3	2012-2016	*IPA III*	7,700,000.00	Rehab of slopes New electro-plant in Trebesica
4	2013	*WBIF*	1,000,000.00	Tunnels
5	2015	*WBIF*	2,500,000.00	Tunnels
6	2014-2016	*IPA*	23,953,500.00	Overhaul of sections: Lutovo – Podgorica, Kos - Trebesica Border Stations at: Bijelo - Polje and Tuzi
		TOTAL	**46,596,750.71**	

Appendix C: A note on Intelligent Transportation Systems (ITS)

C.1 General

As the demand for transportation of people and goods evolves, bigger and more complex transportation systems are developed, calling in turn for advanced ways of planning, control and management. Technological advancements in areas such as materials, communications networks, data storage and mining and remote sensing are constant and their application into transportation greatly expands a network's performance and management capabilities.

In general, systems which make use of the abovementioned technologies, functioning along with the infrastructure and its users in an integrated and interactive fashion, can be categorized as Intelligent Transportation Systems, also abbreviated as I.T.S. (ITS). According to the Road Network Operations & Intelligent Transportation Systems Guide for Practitioners (World Road Association), the definition of ITS and its roles could be summarized into the following:

> *"**Intelligent Transport Systems (ITS)** are the control and information systems that use integrated communications and data processing technologies for the purposes of:*
>
> - *improving the mobility of people and goods*
> - *increasing safety, reducing traffic congestion and managing incidents effectively*
> - *meeting transport policy goals and objectives – such as demand management or public transport priority measures*
>
> *The definition covers a broad array of techniques and approaches that may be achieved through stand-alone technological applications or through integration of different systems to provide new (or enhancements to) existing transport services. ITS provides the tools to transform mobility and improve safety - and is particularly relevant in the context of road network operations."*

C.2 Collection and analysis of transport data

The basis for optimal transportation system management is efficient data collection and analysis. It is nowadays virtually impossible to adequately monitor and understand fundamental operational and performance characteristics of a network by using traditional and/or outdated manual methods which imply significant human input. The number of trips, the size of networks and the complexity of the interaction among different modes require automated data collection and processing systems, which are able to populate extensive databases and perform at least some regular primary analysis in order to assist with decision-making. ITS includes such data collection and analysis tools for the various infrastructure components.

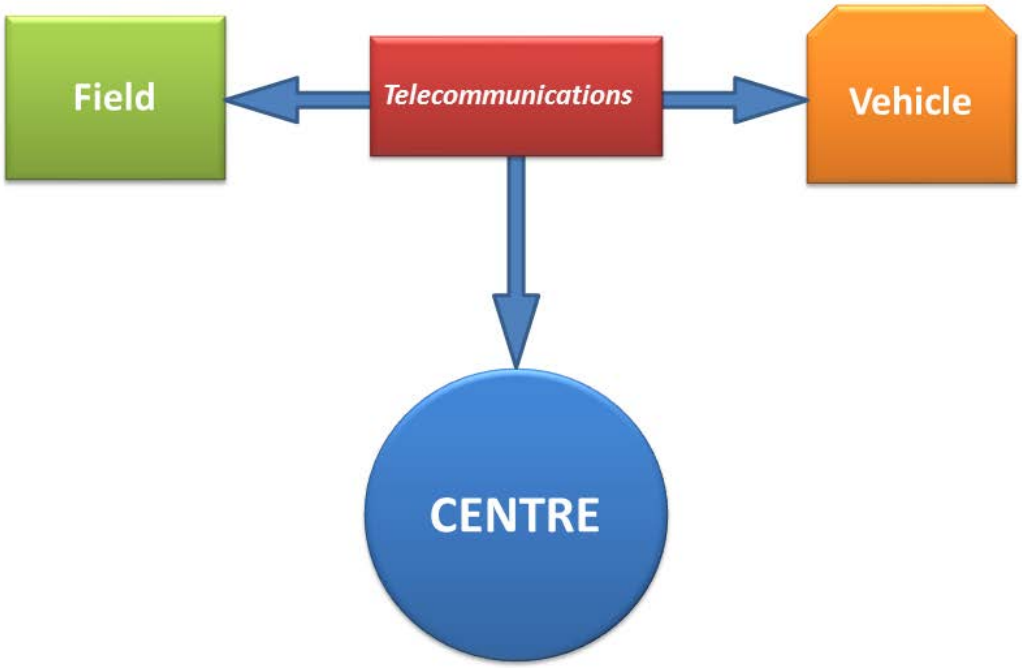

Figure C.1 Multidirectional interaction between components of ITS

The term “field” refers to the transportation infrastructure which facilitates the movement of people and vehicles. This could include (not limited to):

- Roads and Railways (along with their sub-entities, such as pavement, barriers, signs and signals, markings etc.)
- Terminal and transfer stations (e.g. in ports, airports, bus or subway hubs)
- Administrative buildings

A **Vehicle** may refer to any means of transport (passenger car, bus, train etc) regardless of the transport mode it belongs to.

Although housed in specific buildings, the **Centre** essentially refers to the background data storage, analysis and ultimate monitoring system which is the core of an ITS. Its operations are usually carried through in designated buildings which are not necessarily placed within the actual network’s premises.

Telecommunications serve as the intermediary for receiving and sending data from and to the other components (field, vehicle, centre) but also ensuring the dissemination of information to the users. Telecommunication maybe wired, such as a fibre optic cable networks, or wireless, such as cellular or WiMAX technology.

The goals of ITS are achieved by collecting and analyzing several types of data for each component. The following Table 1-1 summarizes common types of data regarding each component and the data results of the preliminary analysis.

Table C.1 Various types of data collected and analyzed for each ITS basic component

Component	Type of information	Devices used	Data Result	Purpose
Field	Infrastructure condition	Laser scanners, road lights sensors, periodic manual inspection	Database with Pavement IRI, pavement damage, barriers and signs condition, road lights health and lifespan	Maintenance User information
	Traffic signals operation	Traffic Signal Controllers	Timing plans and live monitoring of operation	Operations
	Road Closures and Rerouting	Ramp control devices, CCTV, monitoring vehicles	Database and maps for network routing options availability	Operations User information
	Weather conditions	Weather stations, CCTV, drainage sensors	Prevailing weather database for each network section	Safety/Monitoring User information
	Parking space use	Entry/exit counters, parking space sensors	Number of parking spaces available, occupancy and turnover statistics	Operations User information
Vehicle	Position, direction, speed	On-vehicle tracking (e.g. GPS), CCTV, Loop detectors, Other types of traffic sensors	Traffic Volumes, traffic composition (vehicle types), Speed statistics database per section	Safety/Monitoring Operations
	Vehicle condition	On-vehicle sensors (tyres, engine, fuel, oil)	Updated database on vehicle condition (mainly for utility vehicles and mass transit; not yet broadly available for passenger cars)	Maintenance Safety/Monitoring
	Identification	RFID and other transmitters, plate recognition	Vehicle identification	Safety/Monitoring Operations
	Passenger flow	Ticketing system at entry-exit	Passenger volumes, boarding & alighting statistics	Safety/Monitoring Operations
	Freight flow	Online freight declaration systems	Freight volumes and types, entry-exit point statistics	Safety/Monitoring Operations

The Centre is responsible for storing and processing the abovementioned data. In a sense, the analysis results and decisions made upon constitute new data themselves and they are disseminated throughout the network (users, operators, or even the infrastructure and vehicles where interactive intervention systems are installed). The data results may be further analyzed for operations and decision-making and purposes.

C.3 Enforcement, operation and maintenance of network

By analyzing the collected data, there are several options available for their efficient utilization. The simplest form of data use is the formation and population of databases with historical information. This indicates how the network performs under specific conditions, what the maintenance needs and materials' actual life cycle ends up being under realistic conditions of use, how the users interact with the infrastructure and how

they behave through the network. Such information is valuable for future planning in terms of infrastructure, operations and finances.

The principal applications of ITS - that contribute to road network operations are:

- traffic and road network management
- traveller information systems
- public transport systems
- commercial vehicle applications
- vehicle safety applications
- maintenance and construction management applications
- emergency management
- archived data management

C.3.1 Enforcement

A complete monitoring system of the network greatly helps with automating enforcement, assisting police with its operations but also minimizing the need its physical presence both for surveillance and enforcing the law. In the case of road transport, vehicles are monitored for speed with the use of speed cameras, CCTV systems with video recognition software etc. Automated speed tickets are issued and the presence of police is minimized. Other traffic violations (wrong way, entrance into prohibited areas such as improper use of HOV or bus lanes etc) are also captured and the system can additionally raise alarms for danger when necessary, in order for proper action to be taken (dispatch of emergency vehicles or police). For the case of other means of transport, a constant surveillance of trips and trajectories (for example in maritime transport), or the electronic ticket system for mass transit and its connection with access control assists with ensuring an orderly use of the network.

C.3.2 Maintenance

Instead of physically examining every infrastructure aspect of the network, a large number of checks can be carried out through properly installed sensors or at least the use of equipment which is connected with the Centre. Road lights and traffic signal health is monitored and when malfunctions are observed there is an automatic call for replacement/maintenance. Additionally, structural health remote sensors (accelerometers, tiltmeters, thermographs, acoustic sensors, laser etc) constantly monitor critical infrastructure entities, such as bridges and tunnels, by providing information on issues like corrosion, deflection, delamination, cracking and strain.

C.3.3 Operation

The extensive use of ITS has unleashed the potential of transport networks which have otherwise been performing below their capabilities.With the use of RFID transmitters, toll fare collection has been made a lot more efficient. This allows for greater average speeds and less queuing (because of the lack of need for complete stops), reliable distance-correlated charging and the formation of valuable origin-destination databases for the use of the network. In the event of danger alarms or incidents, the dispatching of emergency vehicles is more efficient. The command can be issued from the Centre to

the emergency vehicles already circulating through the network and based on their location the best response strategy can be selected. The information provided to the users is another valuable aspect of the use of ITS. Variable Message Signs (VMS) are able to disseminate crucial messages to the user for the condition of the network (incidents on the road, lane closure, weather conditions, work zones, mass transit delays, route travel times and alternative options etc) or directly instruct for a specific behavior (e.g. with Variable Speed Limits – VSL), which in turn leads to safer transport, along with better utilization of the network's capacity.

C.4 Functionality levels across the network

Especially for the case of road transport, there are significant variations on the importance and role of each section of the network. Road hierarchy is defined by the needs each section covers and also represents certain prioritization logic in terms of investment strategy. Whether it is because of the complexity of the transportation task carried out or because of the allocated budget, a number of different options on ITS equipment are available for various road link types.

For example, it is not expected to face toll stations on local roads, since their construction, operation and maintenance is locally funded and not expected to be repaid by the actual use. Additionally, it will not be appropriate to install expensive VMS systems informing on travel times on sections with very low traffic and their need is evaluated depending on the importance of the road link and the effects of traffic on alternative routes. On the other hand, a simple road light health monitoring system can be installed at a variety of network cases, ranging from urban streets to big motorways, although naturally differentiating in terms of the size of the monitoring system, its backup provisions and database needs.

In Montenegro, there are two main types of roads, namely state and municipal. Municipal roads include local roads and streets within cities or towns whereas state roads can be regional, main and highways (motorways, when available). It has to be noted that road categories can be defined depending on other spatial planning, social or commercial criteria, but in terms of ITS applications, the importance of the road's transport task, combined with its design characteristics is more suitable basis for judgment. Table 1-2 below presents various ITS functionalities and their necessity of operation depending on the road hierarchy.

Table C.2: Various types of ITS applications for different road categories

✓ Important feature ○ Useful / extent of use varies ✕ Not necessary	Road Type			
ITS function	**Municipal**	**State**		
	Local / Streets	**Regional**	**Main**	**Motorways ***
Traffic Detection	○	○	✓	✓
Variable Message Signs (VMS)	✕	○	✓	✓
Structures Remote Sensing (bridges etc)	✕	○	○	✓
Road Light Health Monitoring	○	○	○	✓
Traffic Signals Remote Management	○	○	✓	✓
Utility/Emergency Vehicles Connection	✕	○	✓	✓
Freight Monitoring	✕	○	✓	✓
Vehicle RFID (tolls, special lanes, congestion pricing)	✕	○	✓	✓
Automated Toll Collection	✕	✕	○	✓

**There is no current motorway network in Montenegro. However, this road category is essentially of the same importance as the now operational highways, a number of which is already intended to be upgraded.*

Montenegro is undergoing significant upgrade changes in the transport infrastructure and there are plans for further improvements in the foreseeable future. Although a number of infrastructure projects have recently been completed and others are underway or planned for immediate execution, the sole aspect of ITS has just started to be included. The most prominent cases of ITS integration are tunnel Sozina (already in-place and according to EU Directive on tunnels and roads) and the motorway construction project of the Section Smokovac – Matesevo, which is under construction.

C.5 Centralised control

One of the most important aspects of the various ITS specific functionalities is the ability to send and receive information in a remote operations environment. All transport modes interact with each other and also a huge network does not operate independently through its sections. Hence, the prospect of a monitoring and intervention system which is able to overview as much of the extent of the networks and the different modes of transport as possible is intriguing.

By establishing centralized control and management of resources, there is a substantial advantage towards the direction of an efficient transport network use to its fullest capability. There is constant monitoring of the network performance as a whole, so as to understand where problems occur and require immediate or long-term action. While any area may present bottlenecks or accidents, or passenger/freight flow problems, the central monitoring process shall allow for prioritization on the allocation of emergency vehicles, the decision on construction upgrades or specific operational modifications

such as routing suggestions, variable toll rates etc. As such, every action destined for a specific section can be evaluated in terms of its consequences to neighbouring parts of the network whether it is about short-term interventions or long-term changes. There is also extensive, reliable and comparable data to support investment-related decisions at a broader region level.

The integration of the systems increases their potential and enhances interoperability across regions and operation agencies, whether this refers to state or European level. The co-ordination of a number of tasks concerning transport and the speed of action can be greatly accelerated and improved if data is automatically exchanged between motorway and city centres, public transport operators and users etc.

The success of such an extensive endeavor relies on proper design and cooperation among interacting parts. Every new component, device or procedure established should comply with certain standards in order to ensure seamless coordination. This also assists with procurement bidding and the provision for equal opportunities for a number of contesting manufacturers, against monopolies and under the spirit of free and fair competition.

Based on the abovementioned rationale for centralized monitoring and resource allocation and also smooth cooperation among different components, a state/region can introduce a certain design of ITS Architecture, as is the case with the EU FRAME ITS Architecture. Based on the FRAME definition on ITS Architecture:

> *"An ITS architecture is the conceptual design that defines the structure and/or behavior of an integrated Intelligent Transport System (ITS).*
> *An architecture description is a formal description of a system, organized in a way that supports reasoning about the structural properties of the system. It defines the system components or building blocks and provides a plan from which products can be procured, and systems developed, that will work together to implement the overall system. This may enable one to manage investment in a way that meets business needs."*

In conclusion, the installation of ITS functionalities as an isolated system (e.g. a tunnel) may improve some of the network's or link's features in terms of operations, maintenance etc, but it is not feasible to extend these gains to the entire interacting network of transport and higher-level resource management if there is no centralized monitoring for real time and historical data evaluation.

C.6 Legislative framework

Apart from a country's individual efforts and transport priorities, an extensive legal framework and associated strategic plans have been developed within the European Union. The EU encourages the integration of advanced technology in the area of transportation of people and goods, both with continent- and region-wide legislation. The TEN-T framework, specifically, calls for:

"Innovative technologies, telematics applications and regulatory and governance measures for managing the infrastructure use, shall be taken into account in order to ensure resource efficient use of transport infrastructure for both passengers and freight transport and to provide for sufficient capacity."

TEN-T guidelines

The general requirements from each Member-State are defined in the respective Directives. Understandably, any country wishing to join the EU will have to incorporate such provision into its legislation, although this is a prerequisite anyway defined during the period preceding the actual accession. The related documents and the field which they regulate are summarized in the following Table C.3.

Table C.3: General EU legislation for ITS development

EU Law / Directive	Transport Mode	Field of regulation
Directive 2010/40/EU	Road	- Framework for development of ITS - Introduction of common standards for interoperability and efficiency
Directive 2009/750/EC	Road	- Toll collection systems interoperability
Directive 2008/96/EC	Road	- Safety, monitoring, improvement of infrastructure
Directive 2004/54/EC	Road	- Tunnels (length over 500m)
Directive 2004/52/EC	Road	- Toll collection systems interoperability
Regulation 1315/2013	Railways	- Transeuropean rail network
	Maritime	- VTMIS (Vessel Traffic Monitoring & Information Systems) for Maritime ITS
Decision 661/2010/EU	Railways	- Transeuropean rail network
	Maritime	- VTMIS (Vessel Traffic Monitoring & Information Systems) for Maritime ITS
Regulation 454/2011/EU	Railways	- Passenger services (TAP – trip information, reservation and payment, luggage management, transport modes connections) - Interoperability for 'telematics applications for passenger services'
Regulation 62/2006/EC	Railways	- Freight services (TAF – real-time monitoring of freight and trains, marshalling and allocation systems, reservations, payment and invoicing systems, management of connections with other modes of transport and production of

EU Law / Directive	Transport Mode	Field of regulation
		electronic accompanying documents. - Interoperability for telematics applications for freight
2008/57/EC	Railways	- Interoperability / ERTMS (European Rail Traffic Management System) legislation
Recommendation 2014/897/EC	Railways	- Specifications on the integration of ERTMS - Interoperability for Control Command and Signalling (TSI CCS)
Directive 2002/59/EC	Maritime	- Implementation of VTMIS and SafeSeaNet
Directive 2010/65/EU	Maritime	- Deployment of e-Maritime services, single-window services - Reporting formalities for arrival-departure of ships
Directive 2014/100/EU	Maritime	- Amendment for integration and exchange of data between SafeSeaNet (SSN), CleanSeaNet (CSN) and external systems such as Satellite automatic identification systems (AISs)
General Standards from TC278 (Technical Committee on Road Transport and Traffic Telematics) TC204 (Technical Committee on Intelligent transport systems)	All Transport	- Electronic Fee Collection (EFC) using dedicated short-range communications (DSRC) - Support communications among traffic management centres - Traveller and traffic information exchange

Montenegro has advanced legislation integration in Maritime, having harmonized Directive 2002/59/EC and parts of Directive 2010/65/EU on the single-window system. In terms of road transport, there is no implementation of the EU Directives, however there are already commitments on integrating ITS into new big projects (such as the Bar-Boljare Motorway, section Smokovac-Matesovo: Law OJ MNE 54/14, OJ MNE 52/14) and the 2010/40/EU Directive is destined to be applied during the last quarter of 2017. With the existing EU legislation in mind, the “South East European Parties”, namely the countries of Montenegro, Bosnia and Herzegovina, the Former Yugoslav Republic of Macedonia, Kosovo, the Republic of Serbia and the Republic of Albania have just signed a Treaty with the European Union in the process of joining the EU Transport Community.

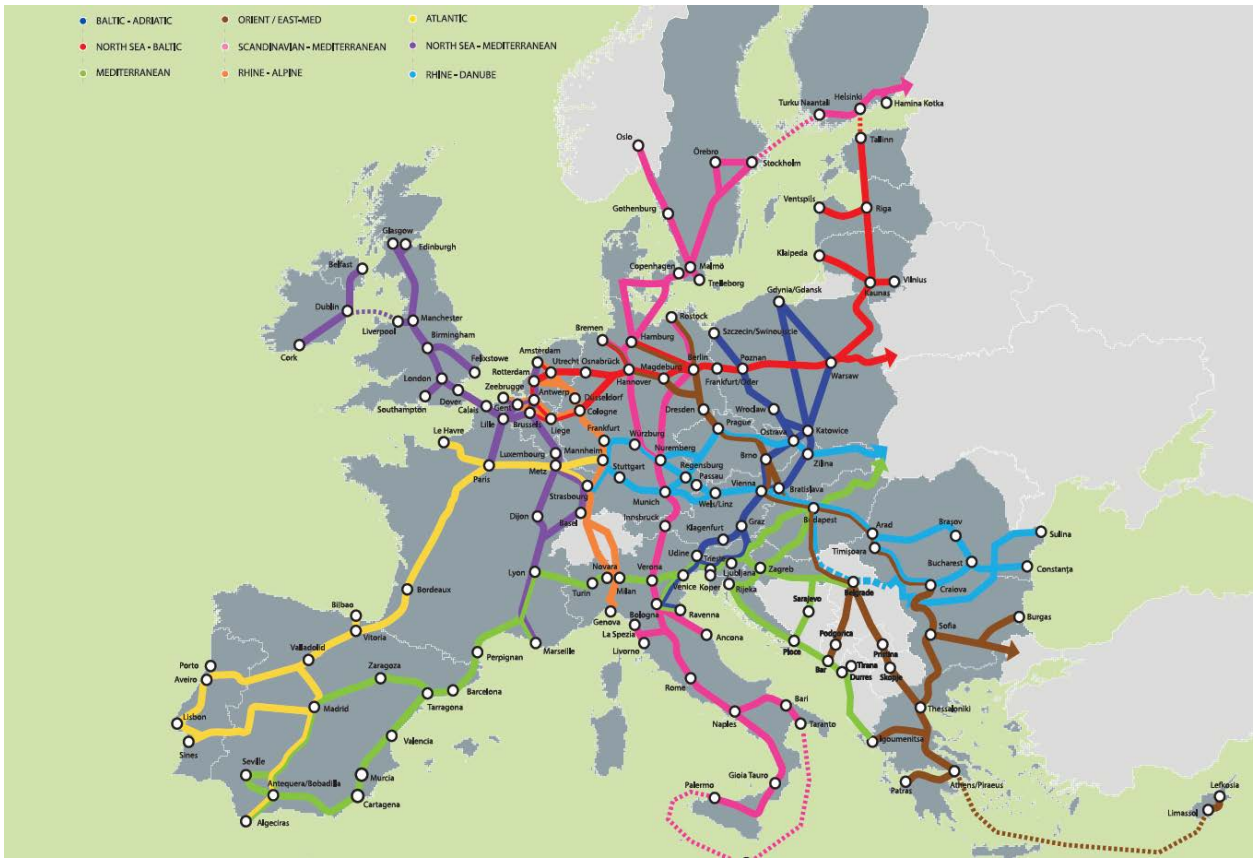

Figure C.2: The Transport Community Network - TENtec

The Treaty builds upon previously developed strategies, and more specifically on materializing the South East Europe Core Regional Transport Network, as defined by the related decisions of 2004 (Luxembourg). According to the abovementioned Treaty, the undersigning States should adopt the following in respect with ITS integration.

Table C.4: WB6 South East Europe Treaty for ITS development

Legislation EU	Official EU Journal	Regulatory Area	Specific field of regulation
Directive 2010/40/EU **(7 July 2010)**	OJ EU L 207, 6.8.2010, p. 1	Intelligent Transportation Systems	Framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport
Commission Implementing Decision 2011/453/EU **(13 July 2011)**	OJ EU L 193, 23.7.2011, p. 48	Intelligent Transportation Systems	Guidelines for reporting by the Member States under Directive 2010/40/EU of the European Parliament and of the Council
Commission Implementing Decision 2016/209/EU **(12 February 2016)**	OJ EU L 39, 16.2.2016, p. 48	Intelligent Transportation Systems	Intelligent Transport Systems (ITS) in urban areas in support of Directive 2010/40/EU of the European Parliament and of the Council on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces

Legislation EU	Official EU Journal	Regulatory Area	Specific field of regulation
			with other modes of transport
Commission Delegated Regulation 305/2013/EU (26 November 2012)	OJ EU L 91, 3.4.2013, p. 1	Intelligent Transportation Systems	Harmonized provision for an interoperable EU-wide eCall
Commission Delegated Regulation 885/2013/EU (15 May 2013)	OJ EU L 247, 18.9.2013, p. 1	Intelligent Transportation Systems	Provision of information services for safe and secure parking places for trucks and commercial vehicles
	OJ EU L 247, 18.9.2013, p. 6	Intelligent Transportation Systems	Data and procedures for the provision, where possible, of road safety-related minimum universal traffic information free of charge to users
Commission Delegated Regulation 2015/962/EU (18 December 2014)	OJ EU L 157, 23.6.2015, p. 21	Intelligent Transportation Systems	Provision of EU-wide real-time traffic information services
Decision 585/2014/EU (15 May 2014)	OJ EU L 164, 3.6.2014, p. 6	Intelligent Transportation Systems	Deployment of the interoperable EU-wide eCall service
Directive 2004/52/EC (29 April 2004)	OJ EU L 166, 30.4.2004, p. 124	Road Toll Systems	Interoperability of electronic road toll systems in the Community
Commission Decision 2009/750/EC (6 October 2009)	OJ EU L 268, 13.10.2009, p. 11	Road Toll Systems	Definition of the European Electronic Toll Service and its technical elements
Directive 2007/46/EC (5 September 2007)	OJ EU L 263, 9.10.2007, p. 1	Type Approval	Framework for the approval of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles

C.7 Financing

Transport projects which are being planned from start should contemplate for ITS integration and their development should be included in the financing and funding strategies, along with the entire project's cost-benefit analysis and its future management. However, existing transport networks are also open to improvements and the addition of ITS may by itself be considered a significant upgrade. For each case, a suitable financing and funding scheme has to be selected, so as to end up with a reasonable solution for the state. Financial constraints for transport plans are tight for the area of the Western Balkans and a project should demonstrate balanced budgets.

Funding will have to be ensured and will have to be provided by parties who acknowledge the long-term direct or indirect value of the project. Parties involved may include the public sector, the actual users and the private sector. The government usually does not expect to get repaid by the operation itself, rather than expecting indirect benefits, because of the socioeconomic long-term growth effects associated

with the project. For the case of infrastructure projects of local importance, where national fund spending is not comfortably justified, user pay-per-use expectations are of outmost importance. Public sector involvement is materialized through national and regional transport investment programmes, special innovation funds and other funding subsidies, whereas the private sector can contribute through transport operator funding, sponsorship and special borrowing arrangements. One of the most popular ways, however, is the Public-Private-Partnership schemes, such as duration-specific concessions in areas such as toll management, which are also associated with further obligations for operations and maintenance. Multi-partner and joint venture funding is also an option, with public and private investors collaborating as stakeholders, spreading the risks and collecting revenue.

For financing, a number of different mixes are available, ranging from EU funds, to state investment and ownership, to private equity and debt financing through capital markets. The financing needs include the one-time capital costs for purchasing and installing equipment and for developing information and control systems, as well as on-going costs for operations, maintenance, and personnel training. Table C-5 below presents the possible origins, types and direct sources of financing for transport projects.

Table C-5 Financing types and sources

Origin	Type	Source
State	Public Investment	National budget
		Special purpose funds (transport)
		Pension funds
International	Donors	Various countries' development aid programmes
	Grants	World Bank International Development Agency (IDA)
		Trans-European Network funds
		CIVITAS Programme
		European Cohesion Fund
		Connecting Europe Facility (CEF)
		Marguerite - 2020 European Fund for Energy, Climate Change and Infrastructure* (*EIB with sponsors)
		European Regional Development Fund
		Europe 2020 Project Bond Initiative - Innovative infrastructure financing* (*Targeted investors are institutional investors such as pension funds and insurance companies)
		ICT for Policy Support Programme
	Loans	World Bank International Development Agency (IDA)
		World Bank International Finance Corporation (IFC)* (*private sector infrastructure)
		European Investment Bank (EIB)
		Loan Guarantee Instrument for Trans-European Networks for Transport (TEN-T) Projects (LGTT)
Private	System Leasing / PPP	Vendor
	Private Equity	Private Sector Banks
		Private Equity Managers
		Capital markets
	Infrastructure Funds	Publicly listed and traded or unlisted closed-end investment funds

C.8 Summary

In conclusion, Intelligent Transportation Systems (ITS) have been a reality in multimodal transport for many years now around the world, assisting with the optimization of

networks' performances and strategic planning. A centralized control and management is essential for the most efficient use of ITS through the interacting transport networks and interoperability among different systems is important for best results over a wider region but also for the cooperation between countries in the new integrated transport community. European legislation has incorporated provisions and guidelines for the integration of ITS in transport for Member-States and countries awaiting accession and a number of financing and funding tools are available through state, European, international institutions and private equity sources. Montenegro is on course in adopting the abovementioned legislation and putting it into practice through its newest and imminently expected construction projects, but significant effort is required for the acceleration of ITS integration, in order for the country's transport system to be on par with today's best practices and to be able to operate seamlessly with other international networks.