

WBC-INCO.NET setting of regional research priorities

Consultation Session on Transport

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# Transport sector research environment in Montenegro

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# Means of Transportation - Past



## Advantages: Past vs Present

- ✓ Environmentally Clean
- ✓ Consume Water and Food

## Disadvantages: Past vs Present

- ✓ Low Efficient

# Means of Transportation - Present



## Advantages: Present vs Past

## Disadvantages: Present vs Past

✓ **Efficient**

✓ **Global warming (GHG - CO<sub>2</sub>)**

✓ **Environmental Pollution  
(NO<sub>x</sub>, CO, PM, HC)**

✓ **Crude Oil Depletion**

✓ **etc**

# Means of Transportation - Future

*Making Sustainable Transportation*

# The Transport S&T system in Montenegro

The Montenegro and Transport policy framework

***The overall Transport policy framework***

The elements of Transport research policy making

Overview of Transport research activities

Transport research projects

Key competencies in Transport research fields

Transport research infrastructure

Key drivers of Transport research

Main Transport sector trends in Montenegro

Main socio-economic challenges in Montenegro

- Ministry of Maritime Affairs, Transportation and Telecommunication is responsible for transport policy.
- Transport strategy is coordinated with the European transport policy and study of regional transport infrastructure in the Balkans (REBIS).
- It has set 6 general strategic goals (2008) for development of transport sector, which corresponds to real needs and possibilities of the Montenegro.

**GOAL 1** - *Safe and secure transport.* Transport system in Montenegro will be developed to ensure a secure and safe transport for all participants, the goods and the environment.

- Safe and secure transport in all sectors.
- Ensuring transparent use of funds for transportation infrastructure.
- Achieving financial sustainability and, in the sectors where it is possible, achieving self-sustainable transport infrastructure.

**GOAL 2** - *Quality and responsible maintenance of transport infrastructure;* Transport system in Montenegro will be developed in a way that will monitor the quality maintenance of transport infrastructure.

- Quality and responsible maintenance of transport infrastructure.
- Shorter time of travel to the most important economic distances in Montenegro.

**GOAL 3** - *Effective transportation;* Transport system in Montenegro will be developed in a way to be effective.

- Efficient and effective system of state institutions.
- Privatized public enterprises that provide transport services.
- Commercialization of activities that follow the maintenance and construction of transportation infrastructure.
- Responsible use of transport infrastructure.

**GOAL 4** - *Economic development*; Transportation system in Montenegro will be developed so it can contribute to the economic development.

- Functional and modern traffic economy able to face competition in the region.
- Maximizing development potential of different regions in Montenegro through the improvements of transport services.

**GOAL 5** – *Environmental protection*; Transport system in Montenegro will be developed to minimize the negative impacts of traffic on the environment.

- Preserved area of Montenegro, protected environment of the negative impact of traffic.

**GOAL 6** – *Integration of Montenegro into the European Union*; Transport system in Montenegro will be developed to facilitate integration into the European Union.

- Stimulant legal and institutional framework for the functioning and development of transport system.
- Montenegro's transport network integrated into the Trans-European transport network.

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In 2005, Montenegro introduced Law on Scientific-Research Activities (Official Gazette of Montenegro, No.71/2005) - the most important legislation in this area.

National Council for Scientific-Research Activities was established.

A Strategy for Scientific-Research Activities was prepared which defines annual budgetary increase, as a % of GDP, allocated to R&D until 2016.

The Strategy determines the following:

- priorities in scientific-research activity;
- indicative amount of resources for funding priorities;
- financial resources plan, the need for scientific-research infrastructure
- the system of scientific informing.

The most important bodies that are in charge for science and research activities, according the Law, are:

- ✓ academies,
- ✓ universities,
- ✓ research institutes and
- ✓ other private and public institutions.

## Other important documents

- Law on Montenegrin Academy of Sciences and Arts («Off. Journal of RoM», No 24/93, 30/94)
- Higher Education Law («Off. Journal of RoM», No 60/2003)
- Development directions of Montenegro as an Ecological State,
- National Strategy of Sustainable Development of Montenegro, etc.

Montenegro had (under the Program FP6) limited access for participation and was defined as 'third country'.

In 2008 Montenegro has joined to FP7 Program for research and technological development as participant with equal rights as other EU countries.

Since February 2007, Montenegro has also been a full partner in the NATO science for peace and security (SPS) programme.

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❖ **365 researchers**  
**(engineering and technology)**

❖ **Structure**

- Bachelor's degree 83
- Master's degree 142
- Doctor's degree 140

# National research organizations in transport sector:

- ❑ University of Montenegro - Maritime Faculty in Kotor  
7 researchers, ([www.fzpkotor.com](http://www.fzpkotor.com))
- ❑ Institute for transportation, in Podgorica, 6 researchers  
([www.intra.cg.yu](http://www.intra.cg.yu), [intra@t-com.me](mailto:intra@t-com.me))
- ❑ University of Montenegro - Faculty of mechanical engineering in Podgorica, 4 researchers  
([www.mf.cg.ac.yu](http://www.mf.cg.ac.yu))
- ❑ Port of Bar, in Bar, 1 researcher ([www.lukabar.cg.yu](http://www.lukabar.cg.yu))

# University of Montenegro – Faculty of Mechanical engineering in Podgorica

- ❖ State of in-use motor vehicles in Montenegro, with respect to energy efficiency and environmental pollution.

Leader of the projects was Prof. dr Božidar Nikolić.  
Project was financed by the faculty itself.

# University of Montenegro – Maritime Faculty in Kotor

- ❖ Definition and optimization parameters for the valorization and development of transportation systems and tourist destinations in their mutual cohesion. Case Study: Montenegro and its Transport - Tourist orientation
- ❖ Optimum connections of marine and continental transportation systems

Leader of both projects was/is Prof. dr Branislav Dragović.

The Ministry of Education and Science has financed both projects.

# The Port of Bar in Bar

- ❖ PORTUS Project. Creating a common strategy of Adriatic ports in order to create conditions for attracting flows of goods from the Far East.
- ❖ APLOMB Project. Formation of the Adriatic logistic network operators.

The leader of projects was Dr Deda Đelović.

# Institute for transportation in Podgorica

- ❖ Possibilities of biodiesel, made from waste cooking oil, application in motor vehicles in Montenegro and its influence on exhaust emission.
- ❖ Current state of gasoline and diesel oil quality in Montenegro, and its influence on conditions of exhaust emission aftertreatment equipment as well on total vehicle fleet.
- ❖ Possibilities of traffic accidents prevention in Montenegro.

Leaders Prof.dr Danilo Nikolić and Đorđije Vučeljić.

Projectrs were financed by themselves.

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## Total 8 research projects in transport

- 4 - are related to road traffic (topics are mainly on influence of motor vehicles on the environment),
- 4 - are interdisciplinary ones involving all types of transport.

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# The Ministry of Education and Science

(<http://www.gov.me/eng/minprosv>) represents official body in charge for research activities in transport area in Montenegro.

- ❑ Special department for Science represents the body which is giving all necessary information related to research projects.
- ❑ Science a network of National Contact Points (NCP) has been established which are in charge for defined thematic fields under FP7 Program and which can help to Montenegrin researchers and scientists to find a way how to participate in this program and how to present their projects in it.
- ❑ In order to help to connect Montenegrin research capacities with EU research capacities under this program it was established web portal [www.mneresearch.ac.me](http://www.mneresearch.ac.me)

# The University of Montenegro

([www.ucg.ac.me](http://www.ucg.ac.me)) is the most important academic institution involved in research projects related to transport development in Montenegro.

- ❑ It comprises of seventeen faculties, three scientific institutes, the library and several specialist departments.
- ❑ Transport related projects are limited to Maritime faculty ([www.fzpkotor.cg.yu](http://www.fzpkotor.cg.yu)) and Faculty of Mechanical engineering ([www.mf.cg.ac.yu](http://www.mf.cg.ac.yu)).

# The Port of Bar

([www.lukabar.cg.yu](http://www.lukabar.cg.yu)) is the largest port in Montenegro, state owned company.

- ❑ Transport related research projects are financed by themselves.

# The Institute for transportation,

([www.intra.cg.yu](http://www.intra.cg.yu)) is the only private company which is dealing with field of transport research.

- ❑ The most important activities under the Institute for transportation are researchs on improving of energy efficiency of road vehicles, lowering exhaust emission from road vehicles, road accident reconstructions, quality of motor fuels, production of biodiesel from used cooking oil with implementation in older vehicle fleet.
- ❑ Institute has accreditation as control institution in transport sector according ISO 17020 and is preparing laboratory accreditation according ISO 17025, and is the a single institution of such kind in Montenegro.
- ❑ Institute for transportation took a part in the project under FP6 Program (CARDS).

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# *Railway traffic*

## Infrastructure

The length of the train tracks in Montenegro is 250 km, representing only 0.07% of the total rail network of Europe.

Rail tracks pass over

122 long bridges (total length 8.863 m),

330 small bridges

through 121 tunnels with total length of 58 km.



**Bar - Vrbnica railway,**  
 Length 169 km. Built in 1976.  
 Permitted axle load 22,5 t  
 per axis. There are 106  
 tunnels, 107 bridges and 9  
 galleries.

**Podgorica - Nikšić railway**  
 length 56,6 km. Built in 1948  
 Since 1992, it has been used  
 solely for freight traffic. It is  
 currently undergoing  
 complete reconstruction and  
 electrification.

**Podgorica - border with  
 Albania railway,** Length  
 24,74 km. Built in 1986.

Map of Montenegro with all current railway lines

# Railway transport

Total capacity of railways is estimated at about 8 mill tons/year.

Rail is currently transporting about 1,2 million cargo per year and about 1,3 million passengers.

The relationship of passengers in the local and remote traffic is fairly constant from year to year and range in comparison 43% to 57%.

Limiting component in railway transport is a consequence of undeveloped railway infrastructure, as well as the lack of freight and passenger cars with satisfactory technical and operational characteristics.

	<i>Amount</i> <i>(mil euros)</i>	<i>Note</i>
Reconstruction of the railway line Bar-Beograd	33	4 years
Reconstruction of the railway line Podgorica-Nikšić	57	3,5 years
Rehabilitation of the railway line Podgorica-Skadar	3	2 years
Construction of the terminal for Inter-modal transport on the railway stations in Bar and Bijelo Polje	3,2	2 years

### Projects of strategic importance

# *Roads and road traffic*

## Road infrastructure

Road network in Montenegro consists of  
850 km of main roads,  
950 km of regional roads and  
5.100 km of local roads.

From a total of 1.847 km of regional and main roads 92% are asphalted.

From about 5100 km local roads about 50% are paved ones.

Density of main and regional roads is 13 km on 100 km<sup>2</sup>.

Road network development in Montenegro, measured as total length of roads (km) to the surface of the land (km<sup>2</sup>) is one of the least developed countries, while according to the number of inhabitants (in 1000) belongs to the medium developed countries.

The main routes are:

### E65/E80/Route 2

Border with Croatia -  
border with Kosovo.  
368 km.

### E762/Route 18

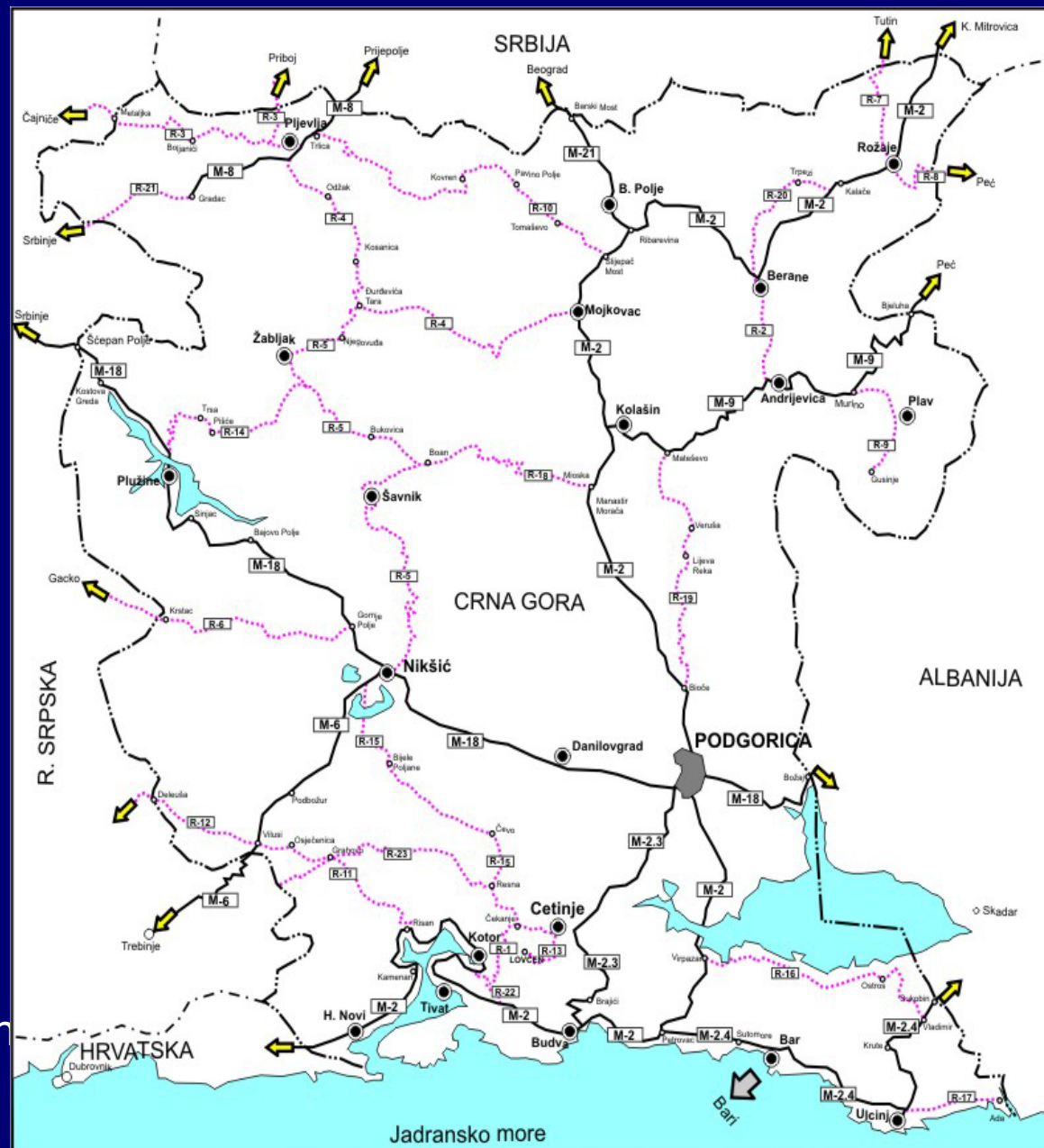
Border with Albania -  
border with Bosnia &  
Herzegovina 163 km.

### E 763

Begins in Belgrade and  
ends in Bijelo Polje,  
Montenegro, 22 km.

### E 851

Begins in Petrovac,  
Montenegro and ends in  
Priština (over Shkoder,  
Alb.), 72 km.



## LEGEND

	<i>Amount (mil euros)</i>	<i>Note</i>
Construction of Adriatic-Ionian highway through Montenegro	770	6 years
Construction of Bar-Boljare highway	2000	5 years
Construction of mini by-pass Podgorica	25	2 years
Construction of the terminal for Inter-modal transport on the railway stations in Bar and Bijelo Polje	3,2	2 years
Reconstruction of coastal road-Podgorica-border with Serbia	35	3 years
Construction of by-pass Bijelo Polje	12	3 years
Reconstruction of road Niksic-border with BiH	93	9 years
Construction of road Risan-Žabljak	93	9 years
Construction of road Gusinje/Plav-Veruša	35	4 years
Construction of road Cetinje-Nikšić	85	5 years
Construction of by-pass Rožaje	14	2 years
Construction and reconstruction of road Herceg Novi-Trebinje, section Meljine-Petijevići	14	3 years
Construction of Verige bridge over Boka Kotorska Bay	87	2,5 years
Reconstruction of Adriatic road	59	5 years
Reconstruction and modernization road Podgorica-Nikšić border BiH	18	3 years
Construction of by-pass Golubovci	10	2 years
Upgrading transport activity within Šavnik and Žabljak with arterial Montenegrin roads	9	2 years

## Road traffic

There are

186.730 passanger cars,

2.348 busses,

13.529 trucks,

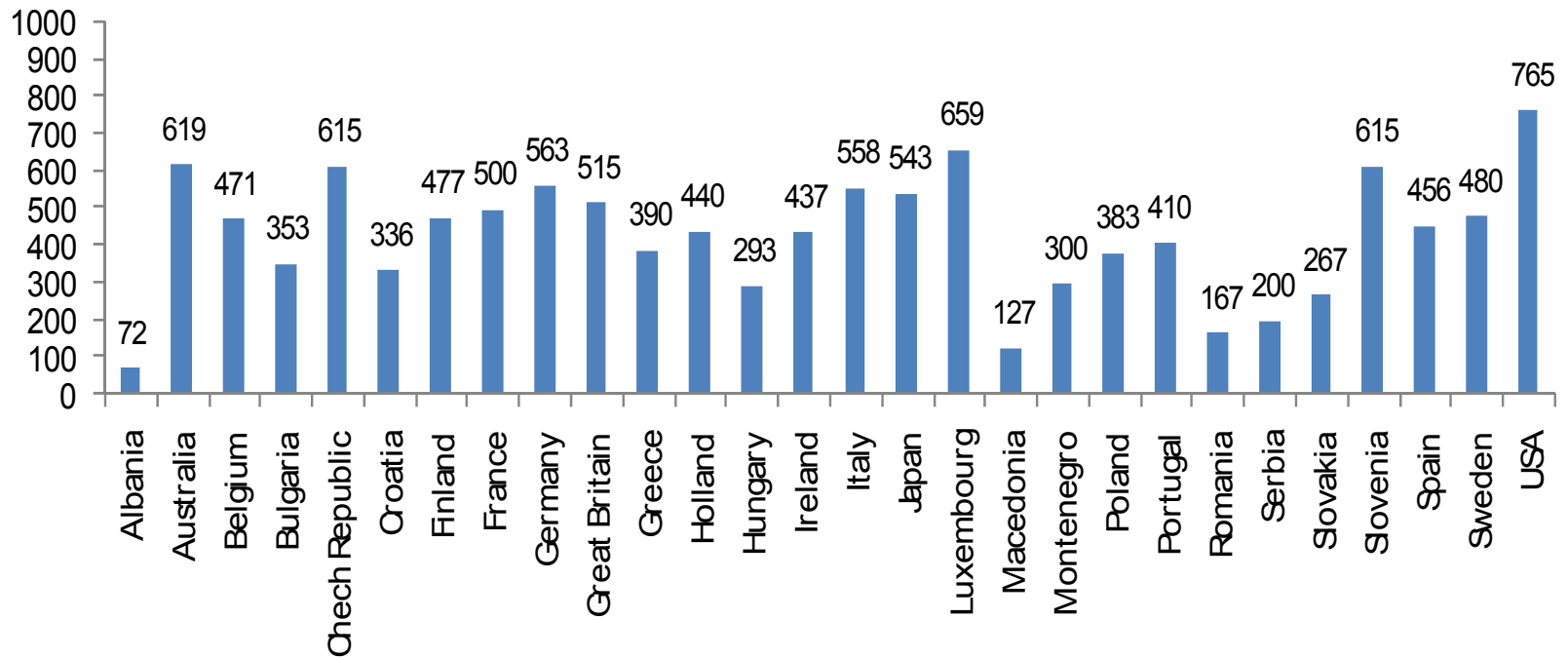
1.767 trailers and

some 2.000 special type vehicles registered in Montenegro.

The motor vehicle fleet is quite old, especially when trucks and buses are considered (e.g. average age for busses is 18 years).

The control of vehicle load in freight transport is inadequate, and excess loads significantly contribute to the damages of the road network.

Maintenance and Inspection are on low level.



*Motorization rate in 2008*

	2003	2004	2005	2006	2007
<b>Transported passengers, thous.</b>	4600	4488	4302	4845	5800
<b>Goods carried, thous. tons</b>	1871	1638	1846	1962	2003

Transported passengers and goods in road transport

# Civil aviation

## Infrastructure

Montenegro has two international airports, with their IATA Airport Codes:

Podgorica Airport	- TGD
Tivat Airport	- TIV

Podgorica Airport has a new and modern terminal building, and Tivat Airport underwent terminal expansion.

There are also airports at Berane, Žabljak and Nikšić, but those are used mostly for general aviation, and are not equipped to handle larger aircrafts.

	Amount (mil euros)	Note
Activation of airport Berane	22	2,5 years

Projects of strategic importance in aviation infrastructure

# Air traffic

Montenegro Airlines d.o.o. is the national carrier airline.

The airline was founded on October 24 1994, by the Government. It operates scheduled services in Europe, as well as charter flights throughout Europe during the summer months.

Aircraft	Total	On Order/Options	Passengers
<u>Fokker 100</u>	4	0	102
<u>Embraer 195</u>	1	2 (1 option)	116

Vektra Aviation is a VIP airline.

The airline was established in 2006, and is catering to needs of Vektra Corporation, as well as providing services of air charter.

Aircraft	Total
<u>Bombardier Challenger 300</u>	1
<u>Beechcraft Hawker 400XP</u>	1
<u>Gulfstream IV</u>	1
<u>Agusta A109</u>	1
<u>Eurocopter Colibri</u>	1

		<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
<b>Transported passengers</b>	Departed	337.170	336.906	350.481	399.076	520.630
	Arrived	296.453	325.741	347.259	434.639	513.089
<b>Goods carried, tons</b>	Dispatched	214	186	812	377	580
	Received	406	459	199	690	594

Transported passengers and goods in air transport

# *Maritime transportation*

In October 2006, Montenegro became a member of the International Maritime Organisation and in February 2007 it accepted the relevant conventions and protocols.

## *Infrastructure*

There are 4 ports open to international traffic

Bar,  
Kotor,  
Risan,  
Zelenika.

Port of Budva is open to international traffic during the 4 months  
of the tourist season.

There are also a number of harbors and marinas for nautical vessels.

Montenegro's rivers are not navigable, except for tourist attractions such as rafting on Tara River.

Total length of navigable waterways of Montenegro is 160 km.

Port of Bar, performs about 95% of all port activities in Montenegro.

In the past 3 years had about 680 stops of cargo ships a year and about 220 stops of passenger ships.

Port can accept ships up to 80.000 tons of capacity.

It is capable of handling about 5 million tons of cargo.

Maximum reloading accomplished was 2,7 million tons in 1989, while in recent years makes reloading of about 2 million tons.

With much smaller capacities in Montenegro work other portss.

	<b>Amount (mil euros)</b>	<b>Note</b>
<b>Construction and reconstruction of infrastructural facilities in the port of Bar</b>	34,7	8 years
<b>Finalization of construction of Marine in Bar</b>	1,5	1,5 years
<b>Revitalization Revitalization of maritime economy of the Port of Virpazar</b>	36	2 years

Projects of strategic importance in marine infrastructure

## Shipping fleet

From a total of 42 overseas ships, with capacity of about 1,3 million DWT, the Montenegrin fleet had at the end of 1980's, came to 0 in 1990s.

Barska plovdba - state owned company. Maintains a transportation line between Bar and Italian ports, and the Italian port and Durres. Annualy, carries out about 90.000 passengers, 16.000 cars, 5.000 trucks and about 2.000 trailers.

NIMONT - ownes 4 ships of total capacity 15.000 DWT

NORMONT - a joint Norwegian-Montenegrin company ownes 2 ships of total capacity 12.000 DWT

"Pomorski saobraćaj" - a company for the transport of vehicles and passengers ownes four ferries with total capacity of 120 pass. cars

	2003	2004	2005	2006	2007
Transported passengers	63575	66187	78281	89855	90872
Goods carried, thous. tons	70	63	60	75	689

Transported passengers and goods in maritime transport

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The key commitment of the Country is integration into the European Union.

15 December 2008      Montenegro submits its application for EU membership

23 April 2008      The Council invites the Commission to submit its opinion on Montenegro's application.

Montenegro has had some success already in creating a favorable business climate and in attracting reputable foreign investors.

Montenegro is in the process of joining the World Trade Organization (WTO), and has joined the Central Europe Free Trade Agreement (CEFTA)

The Montenegrin economy has recently started to grow strongly, following a weaker performance in the early part of the decade.

GDP growth accelerated from 4.2 % in 2005 to 10.7 % in 2007. Growth has been driven by very strong foreign direct investments (FDI), particularly in the tourism and real estate sectors.

Employment and wages have grown strongly, while registered unemployment has decreased from 20 percent in 2005 to 12.1 percent in 2007, with 7 percent of the population living below the poverty line.

	2005	2006	2007
GDP market prices, at current prices, mill.EUR	1.815,0	2.148,9	2.807,9
Population (in thous.) mid year estimate	623,3	624,2	626,2
GDP per capita in EUR	2.919,0	3.443,0	4.484,0
GDP growth rate (%)	4,2	8,5	10,7
Unemployment rate (%)	19,7	14,5	12,1
Inflation (cost of living, %)	2,4	2,3	7,6
Wage growth (%)	7,8	15,5	14,2

Main economic indicators for period 2005-2007

Global financial and economic crisis will have substantial adverse impact on public confidence, credit growth, industry, FDIs and cause financial, external and fiscal vulnerabilities.

GDP growth is likely to decline in 2009–2010 due to global recession:

**Banking sector.** Public confidence remains fragile and bank deposits are declining.

**Industry sector.** Industrial production in Montenegro, records a decrease for the period January-February this year compared to the same period the previous year 12.5%. The KAP production is already halved, and it could shut down completely. Supporting and depending industries will suffer also.

**Construction sector.** Significant decline in private investments on real estate market is evident (drop of 30% for the last months of 2008).

**Tourism sector.** In April number of guest was 16% lower than in the same period last year (on Budva Riviera even 46% lower).

# Integration of Montenegro in the European Research Area in the field of Transport

Participation in the EU's framework programmes and integration into the European Research Area is a priority of Montenegro's science and technology strategy.

On 25 January 2008 Montenegro signed a Memorandum of Understanding with the European Commission which allowed full access to the EU's 7th Research Framework Programme (FP7) which runs from 2007 to 2013. This "associated status" allowed Montenegro to participate in all calls for proposals and compete on an equal footing with the EU Member States for research co-operation and support actions funded by FP7, from 1 January 2008.

In preparation for its participation in FP7, Montenegro has set up a network of National Contact Points (including for transport sector) and organised information days to inform the country's research community about the opportunities offered by FP7.

SWOT analysis of the Transport research  
capacity in Montenegro

### **Strengths**

- Possibility to participate into EU research programmes
- Experience in maritime transportation and traffic

### **Weaknesses**

- Insufficient number of experts and researchers
- Poor research infrastructure
- Small number of realized research projects
- Small financial resources for research
- No strategy for development of R&D in transport sector.

### **Opportunities**

- International cooperation of researchers from the country;

### **Threats**

- Non-existence of the Faculty for transportation and traffic engineering (road, rail and air)
- Monopoly
- Global economic crisis
- Very long period to refund invested money into transport infrastructure

# Transport research priorities for Montenegro

# ***Transport Research priorities on the basis of the country's readiness***

- Research on traffic safety.
- Research on transport originated emissions of pollutants and noise.
- Research on sustainable urban mobility.
- Research on alternative motor fuels.
- Research on modal shift and decongesting transport corridors - promoting the use of cleaner transportation modes and eliminating extra pollution caused by traffic congestion.
- Research on ballast waters management in closed seas.

# *Transport research priorities on the basis of future potential*

- Planning for transport in the future. Making the most of the existing transport network, and planning for future investment, requires integrated planning across the sector. Integrated planning will improve the ease with which goods and people are moved throughout Montenegro.
- Research on influence of transport on public health. Transport sector accounts for highest emission of pollutants in the air in Montenegro, while marine transport pollutes sea waters.

Thank you for your attention!