



Final Report – Component 1 - Impact assessment and cost effectiveness analysis of the Sustainable and Smart Mobility Strategy for the Western Balkans

**Technical Assistance to connectivity in the Western Balkans**

**EuropeAid/13785/IH/SER/MULTI**

**May 2023**



This project is funded by  
The European Union



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## Executive summary

This report is Final Report summarising impact assessment and cost effectiveness analysis of the Sustainable and Smart Mobility Strategy (SSMS) for the Western Balkans<sup>1</sup> (WB6). This assessment was done through the three separate reports on the (1) Baseline Scenario (also referred to as the Business As Usual - BAU Scenario) for the assessment of the potential impacts of the SSMS, the (2) the impact scenarios of the SSMS, and (3) Action Plans and National Targets for each Regional Parties (RP) of the Western Balkans. The region examined consists of six economies - Albania, Bosnia and Herzegovina, Kosovo <sup>\*2</sup>, Montenegro, North Macedonia, and Serbia – together described as RPs. The climate policy framework of the RPs in the region is created based on the process of accession to the EU. The European Union (EU) has set a target that all Member States (MS) will be climate neutral by 2050, which means that net greenhouse gases (GHG) must be zero. Therefore, it is also important for RPs in the region to start their green transition in time.

As a part of achieving this target, there are 67 Actions in 10 Flagship areas listed within the SSMS - including a wide variety of policy and investment Actions which should be undertaken to fully implement the strategy, its targets and move towards a sustainable transport system. The current status of implementation according to Flagship is described in the table below – generalised across all RPs.

*Table ES-1 Level of implementation of the SSMS FLAGSHIP*

Flagship No.	FLAGSHIP name	Level of implementation
FLAGSHIP 1	Boosting the Uptake of Zero-Emission Vehicles, Renewable & Low-Carbon Fuels and Related Infrastructure	Low
FLAGSHIP 2	Creating Zero-Emission Airports and Ports	Low
FLAGSHIP 3	Making Interurban and Urban Mobility More Sustainable and Healthier	Low
FLAGSHIP 4	Greening Freight Transport	Low
FLAGSHIP 5	Pricing Carbon and Providing Better Incentives for Users	Low
FLAGSHIP 6	Making Connected and Automated Multimodal Mobility a Reality	Low
FLAGSHIP 7	Innovation, Data and Artificial Intelligence for Smarter Mobility	Low
FLAGSHIP 8	Working Towards the Single Market	Moderate
FLAGSHIP 9	Making Mobility Fair and Just for All	Low
FLAGSHIP 10	Enhancing Transport Safety and Security	Moderate

<sup>1</sup> <https://www.transport-community.org/wp-content/uploads/2021/06/Strategy-for-Sustainable-and-Smart-Mobility-in-the-Western-Balkans.pdf>

<sup>2</sup> This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo Declaration of Independence.

Transport modelling and energy / GHG emissions modelling were carried out to project the likely scenario into the future through 2050 in 3 scenarios – the Do Nothing (or Baseline) scenario, the Do Something Scenario, and the Decarbonisation Scenario. The graph below shows the dynamics of associated GHG emissions in each scenario.

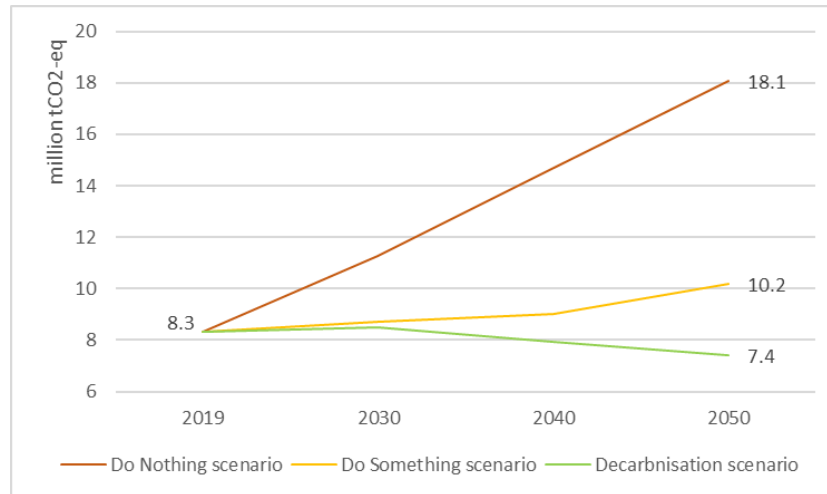


Figure ES-1 WB6 CO<sub>2</sub> emissions estimations for the different scenarios between 2019 - 2050 (million tonnes CO<sub>2</sub>eq per year)

Similarly, the amount of energy projected to be consumed would increase at similar levels (see the figure below).

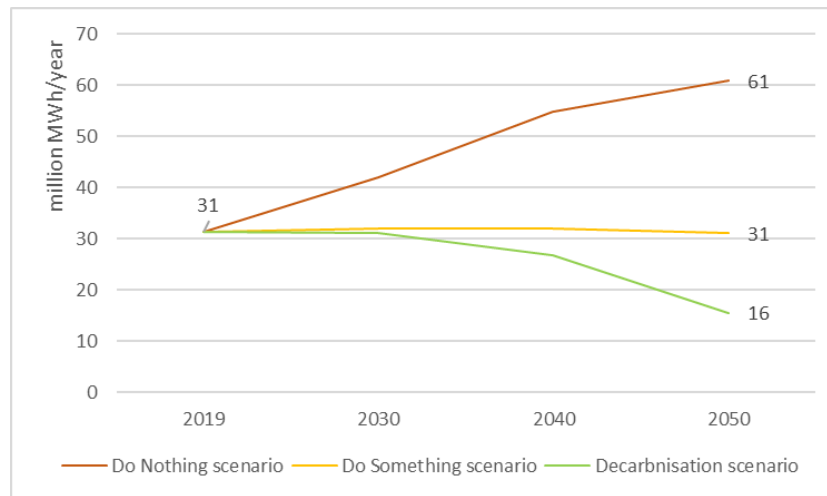


Figure ES-2 Projected energy consumption for the different scenarios between 2019 - 2050 (million MWh/year)

Total amount of final energy consumed would stay at a similar level in the Do Something scenario and go down significantly in the Decarbonisation scenario. This is due to:

- Reduced numbers of km travelled overall due to more public transportation usage;
- The emergence of electric vehicles – which would make up a huge portion of the fleet. Electric vehicles (in particular Light Duty Vehicles – LDVs) are significantly more efficient in terms of final energy consumed per km travelled (approximately 1/3 of the energy is consumed for electric LDVs versus internal combustion engines per km travelled);
- The improvement in the efficiency of fuel efficiency by 37.5% for Light Duty Vehicles (LDVs), 31% for vans by 2040 and 30% for Heavy Goods Vehicles (HGVs) by 2030, in line with the Regulation (EU) 2019/631<sup>3</sup> and Regulation (EU) 2019/1242<sup>4</sup>.

It is projected that annual costs of fuel would increase in the Do Nothing scenario - from an estimated EUR 5.1 billion in 2019 to EUR 9.2 billion in 2050 across the region (not including inflation). The shift of a significant part of the vehicles stock from fossil fuels to electricity could result in cumulative savings in the Decarbonisation scenario of a total of EUR 99.6 billion. There are a number of Actions which combine to have a huge impact on the projected GHG emissions and energy consumption of the transport system in the WB6 region. These include Actions to:

- Improve the infrastructure for alternative fuels (electric vehicle charging, potentially hydrogen refuelling, etc.);
- Encourage the transition of the fleet from internal combustion engines to zero-emission vehicles and / or sustainable fuels;
- Dramatically shift modal shares towards public transportation, rail, waterway, and multi-modal transport – this would need to happen within cities, in between cities, and across the TEN-T network – and would involve better rail connections, improved multi-modal transport, etc.

The costs of implementation of the top 20 Action groups identified for each RP are shown in the table below.

*Table ES-2 Investment and other requirements according to type of source for top 20 Action groups per RP (millions of EUR)*

RP	Central Budget (or entity level)	Municipal / regional budgets	Publicly owned companies	Private sector	Donor support - TA	Donor support - Loans/ Grants	Other	Total
Albania	€814.26	€33.89	€104.53	€2,421.59	€2.90	€1,340.84	€4,461.74	€9,179.75
Bosnia and Herzegovina	€1,570.53	€32.70	€107.04	€2,809.92	€2.80	€1,377.07	€5,887.46	€11,787.53
Kosovo	€567.35	€23.32	€85.36	€1,511.62	€2.35	€843.43	€3,106.44	€6,139.87
Montenegro	€1,089.69	€6.97	€44.97	€770.57	€2.76	€1,321.66	€1,529.48	€4,766.10
North Macedonia	€778.88	€27.07	€92.16	€1,965.01	€2.49	€898.27	€2,898.40	€6,662.29
Serbia	€5,020.72	€213.35	€453.08	€8,053.98	€3.26	€3,471.39	€11,538.21	€28,753.99
<b>Total</b>	<b>€9,841.44</b>	<b>€337.30</b>	<b>€887.14</b>	<b>€17,532.70</b>	<b>€16.56</b>	<b>€9,252.66</b>	<b>€29,421.74</b>	<b>€67,289.52</b>

<sup>3</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02019R0631-20210301>

<sup>4</sup> <https://eur-lex.europa.eu/eli/reg/2019/1242/oj>

The top 20 Action groups comprise almost all of the major investments within the Strategy.

The total costs for implementing all 67 Actions is estimated at about EUR 68 billion across all RPs through 2030, with the heaviest investments in:

- 1.5 Encouraging the introduction of incentives for zero-emission vehicles: EUR 24.6 billion – mostly from private sources (vehicle buyers) but with some incentives from governments;
- 1.1 Transposition of alternative fuel directive: EUR 12 billion – mostly from private sources (charging station owners)
- 3.1 Encourage regional capitals and assist in defining sustainable urban mobility solutions for the major urban nodes along the core network (last mile solutions): EUR 5.6 billion – including major investments by the cities themselves but likely with central government involvement;
- 8.7 Electrification of the rail core network and implementation of Flagship 1, 2, 3: EUR 9 billion – likely requiring public investment since the investments are not profitable;
- 4.3 Ensuring road/rail connections to TEN-T ports/ airports, freight terminals, and removing bottlenecks for intermodal transport: EUR 7.7 billion – mostly with public investment;
- 1.4 Aligning the emission standards across the region, by setting the minimum standard for new cars at EURO6: EUR 4.9 billion – mostly from private sources (vehicle buyers);
- 8.12 Open Public Funds for Railway Fleet Renewal for Passenger and Freight transport: EUR 1.42 billion – to be supported via loans / grants to railway companies and central budget support;
- 6.8 Initiating deployment of 5G transport corridors across region on Core and Comprehensive Network: EUR 1 billion – mostly through private sector investments;
- 8.10 Improving inland waterways through prioritisation of INLAND WATERWAYS projects and Implementation of economic investment plan Flagship 1 projects: EUR 377 million – expected to be mostly from public sources though with private sector cooperation;
- 8.8 Improvement of road and rail border crossings / common crossings (removal of administrative bottlenecks, additional parking lanes, construction of joint BCPs/CCPs): EUR 224 million – expected to be mostly from public sources or donors;
- 8.5 Developing and implementing climate resilience plans for RPs transport networks: EUR 110 million – mostly related to the marginal increased costs of investments for climate resilience.

It is noteworthy that there are significant Technical Assistance (TA) requirements that have been identified in order to implement all 67 Actions – over EUR 58 million through 2030. These amounts are spread out throughout the different Actions. In particular, the TA related to key investment and priority Actions is necessary in the coming years.

# 1 Introduction

The Western Balkans (WB6) region consists of six economies / Regional Parties (RPs) - Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, and Serbia, occupying a territory of about 208,000 km<sup>2</sup> with a population of about 18 million inhabitants. The climate policy framework of the regional parties in the region is created based on the obligations under the United Nations Framework Convention on Climate Change (UNFCCC) and the process of accession to the European Union (EU). All economies in the region, which are the UNFCCC Parties, have non-Annex I status, meaning that they are obliged to submit National Communications (NC) and Biannual Updated Reports (BUR). The Paris Agreement<sup>5</sup>, ratified by five of the WB6 RPs (except Kosovo), commits its signatories to take action to ensure that the global average temperature increase is kept well below 2° and to pursue efforts towards limiting global warming to 1.5°. In line with the European Climate Law<sup>6</sup>, climate neutrality will be reflected in the EU's bilateral relations and accession negotiations with the WB6, who should start transforming their societies accordingly<sup>7</sup>. In line with the European Climate Law to become climate-neutral by 2050, the region has also committed to achieving carbon neutrality by 2050, and to aligning with the European Green Deal's key elements<sup>8</sup> by endorsing the Green Agenda<sup>9</sup> for the Western Balkan (GAWB) at the Summit in Sofia in 2020, and subsequently the GAWB Action Plan, at the Brdo Summit in October 2021.

The process of EU accession requires full alignment of national legislation with the EU acquis (transposition), while the negotiation process between the European Commission (EC) and specific EU candidate determines the deadlines for full implementation for each specific piece of legislation in the economy in question<sup>10</sup>. Due to the status of EU candidates, the WB6 economies are in the process of transposition of EU legal acts, including those related to climate change, energy systems, and transport.

The Sustainable and Smart Mobility Strategy (SSMS) for the WB6 at the EU-level set the basis of the vision on how to put European transport on track for the future. It establishes that the most serious challenge facing the transport sector is to significantly reduce its emissions and become more sustainable. The purpose of developing the Transport Community Permanent Secretariat's (TCPS's) SSMS is to mirror the EU's SSMS and to adjust goals, milestones, and actions of the EU to the realities in the WB6 region in addition to providing the region with a roadmap for decarbonisation and digitalisation of its transport sector. There are 67 Actions in 10 Flagship areas listed within the SSMS - including a wide variety of policy and

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<sup>5</sup> United Nations, Framework Convention on Climate Change. Adoption of the Paris Agreement, 21st Conference of the Parties. Paris, 2015.

<sup>6</sup> Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law') <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32021R1119>

<sup>7</sup> European Commission, Guidelines for the Implementation of the Green Agenda for the Western Balkans. October 2020. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020SC0223>

<sup>8</sup> European Commission, The European Green Deal (COM 2019(640)). <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1576150542719&uri=COM%3A2019%3A640%3AFIN>

<sup>9</sup> Regional Cooperation Council, Sofia Declaration on the Green Agenda For The Western Balkans. November 2020. <https://www.rcc.int/docs/546/sofia-declaration-on-the-green-agenda-for-the-western-balkans>

<sup>10</sup> Regional Cooperation Council, Study on climate change in the Western Balkans region. June 2018. <https://www.rcc.int/pubs/62/study-on-climate-change-in-the-western-balkans-region>

investment Actions which should be undertaken to fully implement the strategy, its targets and move towards a sustainable transport system.

To assess the impact of the SSMS in the WB6 region, i.e. to assess its advantages, an incremental approach is recommended, which compares the Do Nothing scenario with an aggressive Decarbonisation scenario and a less aggressive Do Something Scenario. For these scenarios, transport modelling was carried out as was energy / GHG emission modelling.

The Decarbonisation scenario is scenario under which all actions proposed within the SSMS are implemented fully. The Reports estimate the costs and benefits of numerous key actions, overall costs and prioritisation of Actions, and the impacts of their implementation.



## 2 Gap Analysis

As mentioned, there are 67 Actions in 10 Flagship areas listed within the SSMS - including a wide variety of policy and investment Actions which should be undertaken to fully implement the strategy, its targets and move towards a sustainable transport system. A Gap Analysis was conducted assessing the level of implementation across the 6 RPs - screened as per following indicators:

- a) **not started** (activities related to this action not started at all or there are no important steps conducted)
- b) **low** (low level of action development: 0-25% of the action work completed),
- c) **moderate** (moderate level of action development: 25-50% of the action work completed),
- d) **steady** (steady level of action development: 50-75% of the action work completed), and
- e) **advanced/completed** (steady level of action development: 75-100% of the action work completed).

An overview of the SSMS flagships' assessment per Flagship is presented in the table below, with detailed analysis within Deliverable 1 of this Component: *"Baseline scenario and analysis of the Sustainable and Smart Mobility Strategy for the Western Balkans roadmap"*.

Table 2-1 Level of implementation of the SSMS FLAGSHIP

Flagship No.	FLAGSHIP name	Level of implementation
FLAGSHIP 1	Boosting the Uptake of Zero-Emission Vehicles, Renewable & Low-Carbon Fuels and Related Infrastructure	Low
FLAGSHIP 2	Creating Zero-Emission Airports and Ports	Low
FLAGSHIP 3	Making Interurban and Urban Mobility More Sustainable and Healthier	Low
FLAGSHIP 4	Greening Freight Transport	Low
FLAGSHIP 5	Pricing Carbon and Providing Better Incentives for Users	Low
FLAGSHIP 6	Making Connected and Automated Multimodal Mobility a Reality	Low
FLAGSHIP 7	Innovation, Data and Artificial Intelligence for Smarter Mobility	Low
FLAGSHIP 8	Working Towards the Single Market	Moderate
FLAGSHIP 9	Making Mobility Fair and Just for All	Low
FLAGSHIP 10	Enhancing Transport Safety and Security	Moderate

### 3 Baseline and Impact Assessment

For the most part, the targets defined within the SSMS are regionally applicable. There is little differentiation between the different RPs. The only exception wherein there would be differentiation would be in the area of electrification of railways – wherein there is a very different starting point for the various RPs. The table below shows the SSMS targets – which can be interpreted as being the same for each RP – with special notes on the air and rail-related targets.

Table 3-1 Overview of targets from the SSMS

Targets
1) By 2030, at least 10% of cars and 5% of lorries in operation, to be zero-emission
2) By 2050, 90% of all cars, vans, buses as well as new heavy-duty vehicles to be zero-emission.
3) From 2022, all newly constructed railway lines to be electrified.
4) By 2050, greenhouse gases emissions from waterborne transport to be largely eliminated and airports to be made zero-emission nodes. <sup>11</sup>
5) By 2023, Inter-city rail transport between capitals in the Western Balkans, on existing connections, to be re-established.
6) By 2025, the Regional Rail Market to be opened.
7) By 2030, rail freight traffic to increase by 20%. This is to double by 2050
8) By 2030, transport by inland waterways and short sea shipping to increase by 15%. This is to increase by 30% by 2050
9) By 2035, scheduled collective travel under 500 km, within the Western Balkans, to be carbon-neutral
10) By 2035, the Core Rail Network to be compliant with TEN-T standards. <sup>12</sup>
11) By 2035, regional capitals and major urban nodes to be transport emission free. <sup>13</sup>
12) By 2035, rail and waterborne-based intermodal transport to compete on equal footing with road-only transport in the Western Balkans.
13) By 2050, all external costs of transport within the Western Balkans to be covered by the transport users.
14) By 2035, seamless multimodal passenger transport to be facilitated by integrated electronic ticketing and freight transport to be fully digitalised.

<sup>11</sup> Note: for air travel in general, reduction of 45-50% comparing to 2019 emissions is the target for EU-27, Switzerland, Norway, UK, WB6 and Turkey: impact of available seat kilometres (ASK) growth (-65%), switch to New Engine Option (NEO) generation aircraft (-25%); introduction of Hybrid Electrical Cryoplane and Airships (HECA) (-15%); introduction of novel aircraft technology – hydrogen/electric/hybrid aircraft (-30%); operational improvements (<5%); use of sustainable aviation fuels (SAFs) (-40%); demand effects of CO2 pricing (-5%); residual emissions to be offset (-50-55%). However, this is mostly not related to the GHGs at the nodes themselves, but rather the aircraft.

<sup>12</sup> Increasing from the following: a) ALB: No electrified rail network. (Durrës-Tirane route currently being electrified), b) BIH: Electrified rail network: Core 100% (432 km) and 76.8% Comprehensive, c) KOS: No electrified rail network, d) MKD: Electrified rail network: Core 79.7% (216 km) and 39.6% Comprehensive, e) MNE: Electrified rail network: Core 100% (202 km) and 86.4% Comprehensive, and f) SRB: Electrified rail network: Core 76.8% (1075 km) and 63.4% Comprehensive.

<sup>13</sup> Note that much of the transport systems within the regional capitals are governed by local municipalities and therefore difficult to address from a regional perspective or at RP level. However, there can be a significant influence by RP-level governance institutions.

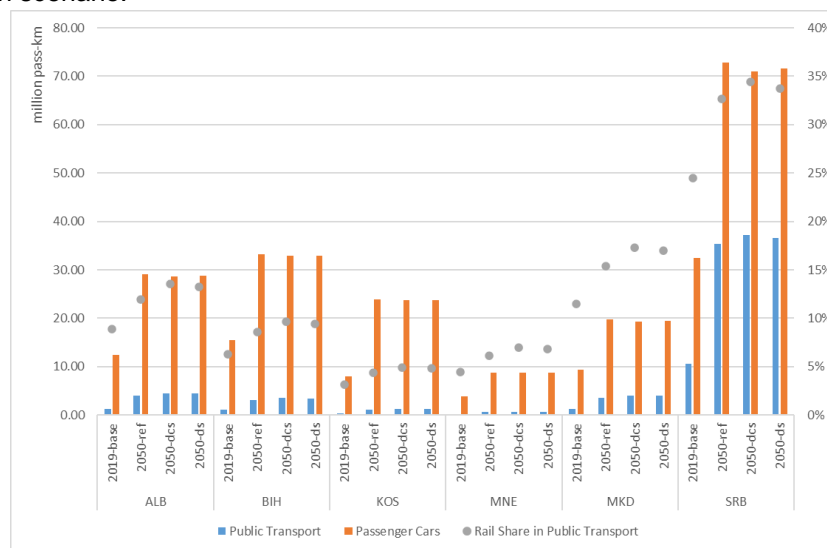
### Targets

- 15) By 2040, automated mobility to be deployed on a large scale.
- 16) By 2035, A multimodal Trans-European Transport Network equipped for sustainable and smart transport with high-speed connectivity to be operational for the core network, and, by 2050 for the comprehensive network.
- 17) By 2050, the death toll for all modes of transport in the Western Balkans to be close to zero.
- 18) By 2050, all process related to transport of dangerous goods (production, packing), as well as transport per se to be safe, eco-friendly, and more sustainable.

A related variable to these impacts is the greening (or lack thereof) of the electricity production mix in the region – as it will be a key energy carrier for vehicles in the Do Something and Decarbonisation scenarios.

Most of the Actions to be undertaken as part of the SSMS are to be carried out at the RP level. Additionally, significant actions are to be taken by municipalities in the region. Transport modelling and energy / GHG emissions modelling were carried out to project the likely scenario into the future through 2050 in the 3 scenarios. A summary of the results of the transport model is described below.

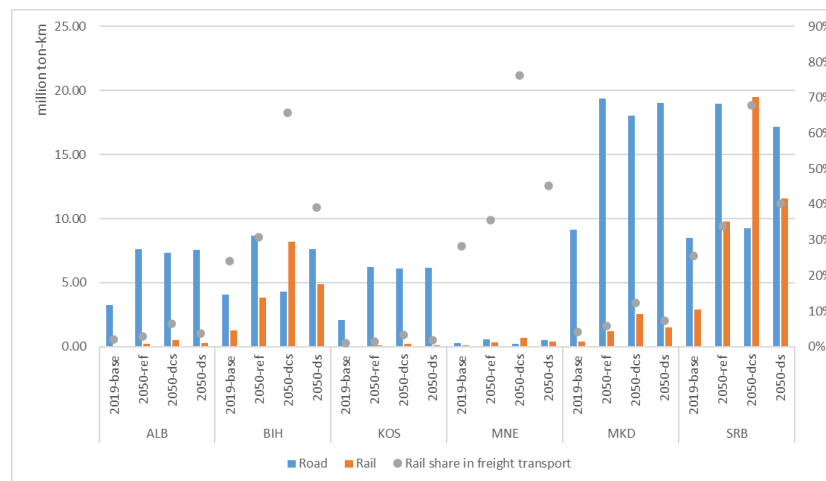
The total number of transported passengers by rail, as a percentage of all transported with public transport in all RPs in 2050 (Decarbonisation scenario) is in the range slightly over 30% in Serbia, around 15% in Albania and North Macedonia, and in the range 5-10% in Bosnia and Herzegovina, Kosovo, and Montenegro. In the Do Something and Do-Nothing scenarios these shares are lower – with a maximum of up to 15%. The graph below shows the amount of passenger km according to type of transport in each of the 6 RPs in each scenario.



\* base = Base year, ref = Reference (Baseline) scenario / Do Nothing scenario, ds = Do Something scenario, dcs = Decarbonisation scenario

Figure 3-1 Passenger traffic and mode share on the level of RP in the Base year (2019) - Do Nothing, Do Something, and Decarbonisation scenarios (in million passenger-kilometres per year)

Related to freight, the total number of transported freights by rail, as a percentage of all transported freight in all RPs in 2050 (in the Decarbonisation scenario) is in the range of 65-75% in three RPs (Bosnia and Herzegovina, Montenegro, and Serbia), compared to the Do-Nothing scenario wherein it is 30-35%. The share of freight by rail is significantly less in 2050 (in the Decarbonisation scenario) in Albania (6%), Kosovo (3%) and North Macedonia (12%). In the Do-Nothing scenario rail transport of freight is significantly less than 10% for these three RPs. The graph below shows the amount of tonne-km according to type of transport in each of the 6 RPs in each scenario.



\* base = Base year, ref = Reference (Baseline) scenario / Do Nothing scenario, ds = Do Something scenario, dcs = Decarbonisation scenario

Figure 3-2 Freight traffic and mode share on the level of RP – Do Nothing, Do Something, and Decarbonisation scenarios (in million tonne-kilometres per year)

The transport model was then translated to an energy / GHG model. A summary of the results of the 3 scenarios can be described as follows:

- Under the Do-Nothing (or Baseline) scenario, GHG emissions in the transport sector are expected to almost double by 2050. The projected total GHG emissions are expected to increase from 8.3 million tCO<sub>2</sub>eq in 2019 to 18.0 million tCO<sub>2</sub>eq in 2050.
- In the Do Something scenario, GHG emissions in the transport sector would stay stable around 8.3 million tCO<sub>2</sub>eq with a small increase on the first ten years and slowly decreasing afterwards until reaching 10.2 million tCO<sub>2</sub>eq in 2050.
- In the Decarbonisation scenario, GHG emissions in the transport sector would also remain stable during the first ten years around 8.3 million tCO<sub>2</sub>eq, then reducing in the following 20 years to 7.4 million tCO<sub>2</sub>eq in 2050, less than half of the Do-Nothing scenario.

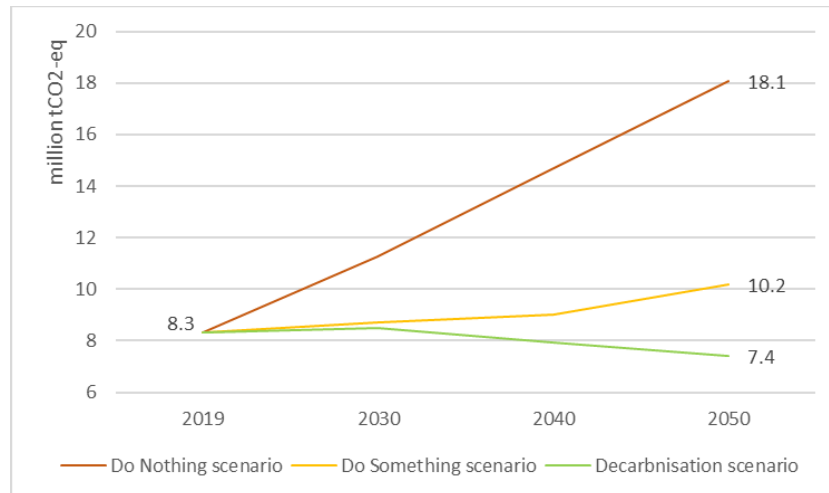


Figure 3-3 WB6 CO<sub>2</sub> emissions estimations for the different scenarios between 2019 - 2050 (million tonnes CO<sub>2</sub>eq per year)

**Key parameters for GHG emissions not entirely within the scope of the transport sector:** As mentioned previously, there are two key drivers for greenhouse gas reduction:

- total energy consumed – which is based on kilometres travelled and the type of vehicle, and
- the GHG emission factor of the energy that is consumed. Emissions factors (in tonnes CO<sub>2</sub> per unit of energy) for fossil fuels such as diesel and petroleum are fairly standard across economies.

However, the emissions factor for the electricity grid (known as the Grid Emissions Factor) is highly variable. **In the region, most RPs have a grid emissions factor of well over 0.50 tCO<sub>2</sub> per MWh<sup>14</sup> (with the exception of Albania which is reliant mostly on hydropower). This compares unfavourably to the EU average in 2019 of 0.275 tCO<sub>2</sub> per MWh<sup>15</sup>.** Since the power sector is outside of the scope of this report, we have assumed constant Grid Emissions Factors for the RPs.<sup>16</sup> This means that the GHGs do not decrease as much as the energy consumption. If electricity production undergoes a drastic shift to renewable energy, then the GHG emissions would decrease dramatically in the Decarbonisation scenario.

Similarly, the amount of energy projected to be consumed would increase at similar levels (see the figure below) – with the following summary of the 3 scenarios:

<sup>14</sup> <https://unfccc.int/documents/198197>

<sup>15</sup> <https://www.eea.europa.eu/data-and-maps/indicators/overview-of-the-electricity-production-3/assessment>

<sup>16</sup> The grid emissions factors used were based on [https://unfccc.int/sites/default/files/resource/Harmonized\\_Grid\\_Emission\\_factor\\_data\\_set.xlsx](https://unfccc.int/sites/default/files/resource/Harmonized_Grid_Emission_factor_data_set.xlsx): Albania: 0.0 tCO<sub>2</sub>eq/MWh, Bosnia and Herzegovina: 0.739 tCO<sub>2</sub>eq/MWh, Kosovo: 0.843 tCO<sub>2</sub>eq/MWh, Montenegro: 0.471 tCO<sub>2</sub>eq/MWh, North Macedonia: 0.563 tCO<sub>2</sub>eq/MWh, and Serbia: 0.678 tCO<sub>2</sub>eq/MWh

- Under the Do-Nothing scenario, there would continue to be a heavy focus on energy from petrol and diesel (over 90% of consumption) – and an increase in total energy consumed from 31.4 TWh / year to 60.9 TWh per year
- In the Do Something scenario, energy consumption in the transport sector would remain stable around an annual consumption of 31.4 TWh until 2030, and then drop slowly until reaching a total energy consumption of 31.1 TWh per year.
- In the Decarbonisation scenario, energy consumption in the transport sector would continue around an annual energy consumption of 31.4 TWh in 2030, reducing significantly on the following years to reach a total consumption of 15.6 TWh per year.<sup>17</sup>

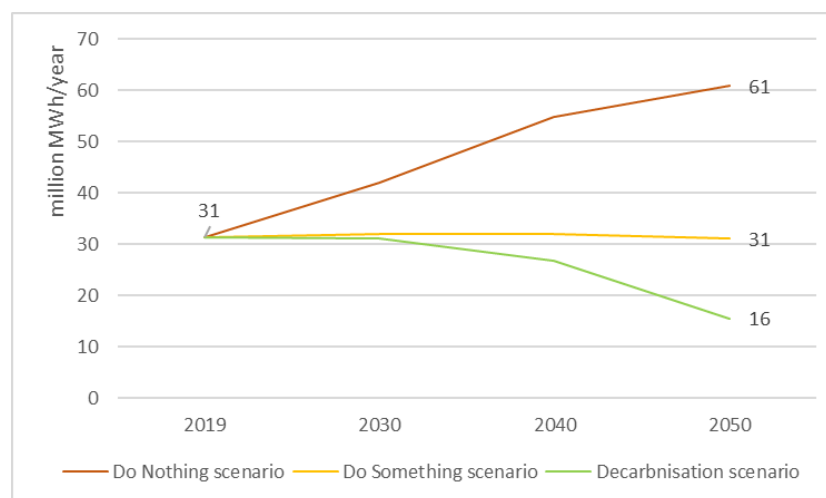


Figure 3-4 Projected energy consumption for the different scenarios between 2019 - 2050 (million MWh/year)

It is important to note a few things about these projections that **the total amount of final energy consumed would stay at a similar level in the Do Something scenario and go down significantly in the Decarbonisation scenario.** This is due to:

- Reduced numbers of km travelled overall due to more public transportation usage.
- The emergence of electric vehicles – which would make up a huge portion of the fleet. Electric vehicles (in particular Light Duty Vehicles – LDVs).<sup>18</sup>

<sup>17</sup> It should be noted that this represents final energy consumption – which is different from primary energy consumption. Given the increased use of electricity, it is possible that there would be little to no reduction of primary energy consumption if the electricity system continues to be primarily coal-based – since thermal energy usually has a ration of 3:1 or 2:1 in terms of primary energy consumed to final energy consumed.

<sup>18</sup> Note that electric vehicles are significantly more efficient in terms of final energy consumed per km travelled (approximately 1/3 of the energy is consumed for electric LDVs versus internal combustion engines per km travelled). However, the RPs and the EU are also focused on the amount of “primary energy” consumed – which reflects losses in the transformation of energy from – for example – coal to electricity, and reflects losses in the transmission and distribution process for electricity. For this reason, the amount of

- The improvement in the efficiency of fuel efficiency by 37.5% for Light Duty Vehicles (LDVs), 31% for vans by 2040 and 30% for Heavy Goods Vehicles (HGVs) by 2030, in line with the Regulation (EU) 2019/631<sup>19</sup> and Regulation (EU) 2019/1242<sup>20</sup>.

As a direct influence from the reliance on petrol and diesel in the transport system in the Do Nothing scenario, based on a price of EUR 1.45 per litre for petroleum and EUR 1.70 per litre for diesel, it could be expected that annual costs of fuel would increase from approximately EUR 5.1 billion in 2019 to EUR 9.2 billion in 2050 across the region (not reflecting inflation). Given the volatility of petroleum and diesel prices, the 2019 estimate is a simplified estimate (as is the 2050 estimate) – but it does show the order of magnitude for energy costs in the Do-Nothing scenario. The shift of a significant part of the vehicles stock from fossil fuels to electricity will report significant financial benefits over the years. Using a reference cost of electricity of 0.10 EUR/kWh, the total cumulative savings from the Do Something scenario would reach EUR 75 billion, and the decarbonisation scenario a total of EUR 99.6 billion.

*Table 3-2 Projected savings due to fuel cost in the Do Something and Decarbonisation scenario (billion EUR cumulative)*

	2050
Do Nothing scenario	0.0
Do Something scenario	75.0
Decarbonisation scenario	99.6

It is worth noting that there is significant over-lap / interaction between the SSMS and other strategic goals in the region. In particular, Integrated National Energy and Climate Plans (NECPs) are being developed / have been developed in all RPs which outline – amongst other things - the measures to be taken to reduce net GHGs. Within these plans and strategies there are significant measures related to sustainable transport, which should basically include the same measures.

There are a number of Actions which combine to have a huge impact on the projected GHG emissions and energy consumption of the transport system in the WB6 region. These include Actions to:

- Improve the infrastructure for alternative fuels (electric vehicle charging, potentially hydrogen refuelling, etc.),
- Encourage the transition of the fleet from internal combustion engines to zero-emission vehicles and / or sustainable fuels,

<sup>19</sup> “Primary energy” consumed could potentially be similar to the Do Nothing scenario if the electricity grid does not become more efficient by incorporating renewable energy such as solar and wind (which have much lower losses between primary and final energy). However, since the energy transformation, transmission, and distribution sector are not a subject of the SSMS, primary energy consumption is not examined.

<sup>19</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02019R0631-20210301>

<sup>20</sup> <https://eur-lex.europa.eu/eli/reg/2019/1242/oj>

- Dramatically shift modal shares towards public transportation, rail, waterway transport, and multi-modal – this would need to happen within cities, in between cities, and across the TEN-T network – and would involve better rail connections, improved multi-modal transport, etc.

Achieving the targets of the SSMS will necessitate significant efforts at:

- creating an appropriate regulatory environment,
- facilitating flow of information through improving of processes, infrastructure, facilities, equipment, and capacities, and
- investing in the appropriate vehicle fleets to allow for a low-carbon transition.



## 4 Prioritisation of Actions and Top 20 Action Groups for RPs

For the prioritisation of the most important actions, Multi-Criteria Analysis (MCA) was carried out for all 67 Actions of the SSMS combined with simplified Cost-Benefit Analysis (CBA). Since the flagships and actions are based on the adopted SSMS in the WB6, in fact, all of them should be implemented. Implementation of the Strategy is mostly intended to comply with EU requirements (i.e., most actions involve compliance with technical standards from EU legislation). However, even so, there is a great need to focus resources on the most effective actions.

The following criteria were identified for ranking/prioritisation of 67 Actions within SSMS:

1. **Criterion 1: Is it cost-effective (using simplified CBA for quantifiable Actions)?**  
i.e. Will we decrease operating costs or will we increase benefits well above increased costs if we take this action? (not applicable for all measures)
2. **Criterion 2: What is its impact on decrease of GHG emissions?**  
i.e. Will it have a significant impact in a move towards lower GHG footprint?
3. **Criterion 3: Is it a critical path measure?**  
i.e. Will it delay the implementation of other related activities? How necessary is its implementation for the sector as a whole?
4. **Criterion 4: Are there capacities for implementation?**  
i.e. Do the stakeholders have sufficient resources for implementation?
5. **Criterion 5: Does it have social impact including impact on vulnerable groups?**  
i.e. Will it help towards social inclusion? Will social conditions improve (better and affordable accessibility etc.)?

The Criteria were weighted according to a survey carried out amongst relevant experts, TCPS and RP representatives, and then each Action was evaluated according to these criteria.

Certain actions which are integrally linked to each other were grouped together. The top 20 Actions/Groups of Actions for each RP are shown in the tables below.

These Actions/Groups of Actions as well as the remaining ones per RP are further elaborated in the report *“Action Plans and National Targets for each Regional Party of the Western Balkans”*.

Action Number and Title	ALB	BIH	KOS	MKD	MNE	SRB
1.1. Transposition of alternative fuel directive	1	1	1	1	1	1
1.2. Deployment of e charging stations on the busiest corridors						
4.1. Improving multimodality through transposition of intermodal/multimodal legislative framework	2	2	2	2	2	2
1.4. Aligning the emission standards across the region, by setting the minimum standard for new cars at EURO6	3	3	3	3	3	3
1.6. Improve emission testing in roadworthiness checks						
4.6. Rail Corridor Initiative – Western Balkans to join the Rail Freight Corridors	4	4	4	4	4	4
4.2. Assessment of bottlenecks in modal interconnections and the current incentive system in place						
4.3. Ensuring road/rail connections to TEN-T ports/ airports, freight terminals, and removing bottlenecks for intermodal transport	5	5	5	5	5	5
4.4. Construction of intermodal terminals and purchase of related equipment						
3.1. Encourage regional capitals and assist in defining sustainable urban mobility solutions for the major urban nodes along the core network (last mile solutions)	6	6	6	6	6	6
8.10. Improving inland waterways through prioritisation of INLAND WATERWAYS projects and Implementation of economic investment plan Flagship 1 projects	-	7	-	-	-	7
3.2. Introduction of regionally aligned Public Service Obligation for international passenger rail transport	7	8	7	7	7	8
3.3. Better manage and coordinate international rail traffic, including if necessary, through revised rules for capacity allocation and infrastructure charging in rail	8	9	8	8	8	9
6.7. Deployment of Mobility as a Service (pax and freight) applications and digital transport corridors, smart mobility solutions and multimodal travel information services	9	10	9	9	9	10
2.2. Setting the foundation for deployment of alternative fuels infrastructure through transposition of relevant EU acquis in the air and waterborne sectors	10	11	-	-	10	11
3.4. Transposition of the Provisions of the Fourth Railway Package	11	12	10	10	11	12
6.1. Enable B2A multimodal data exchange through implementation of the e-FTI Regulation and Maritime Single Window environment	12	-	-	-	-	-
1.5. Encouraging the introduction of incentives for zero-emission vehicles	13	13	11	11	12	13
6.9. Enable environment for multimodal ticketing in passenger transport and transpose relevant legislation	14	14	12	12	13	14

<b>Action Number and Title</b>	<b>ALB</b>	<b>BIH</b>	<b>KOS</b>	<b>MKD</b>	<b>MNE</b>	<b>SRB</b>
6.3. Initiation of deployment of ERTMS through transposition of EU directives, TSIs, preparation of project documentation and deployment	15	15	13	13	-	-
6.4. Deployment of ITS through transposition of EU directives, standards, preparation of project documentation and deployment	-	16	14	14	14	15
6.8. Initiating deployment of 5G transport corridors across region on Core and Comprehensive Network	16	19	17	17	17	18
1.3. Undertake feasibility study on the use of hydrogen on trucks along the busiest corridors	-	18	16	16	16	17
8.9. Reforming the railway sector through transposition and implementation of Market opening, passenger rights, interoperability, border crossings/ common crossings legislation	17	-	18	18	18	-
5.2. Adopt and implement guidelines for operators and platforms to inform passengers about the carbon footprint of their trip and to enable passengers to voluntarily offset it, and for wider use of eco-routing for (in-built) navigation software	18	-	19	19	19	19
8.12. Open Public Funds for Railway Fleet Renewal for Passenger and Freight transport	19	17	15	15	15	16
8.7. Electrification of the rail core network and implementation of Flagship 1, 2, 3	20	20	20	20	20	20

According to the scoring carried out, the following 20 Actions/Group of Actions can be considered a priority for the region and per RP. As can be seen from the table, first 6 Actions/Groups of Actions are top priorities in all 6 RPs. The top two Flagships with Actions/Groups of Actions in the top 20 are:

- Flagship No. 1 - Boosting uptake of zero-emission vehicles, renewable & low-carbon fuels and related infrastructure – where all six Actions are in the top 20 prioritised Actions/Groups of Actions, and
- Flagship No. 4 - Greening freight transport – where 5 out of 6 Actions/Groups of Actions in the top 20 prioritised.

The three Flagships (Flagship No. 7 - Innovation, Data and Artificial Intelligence for Smarter Mobility, Flagship No. 9 - Making mobility fair and just for all and Flagship No. 10 - Enhancing transport safety and security) did not have Actions/Groups of Actions ranked in the top 20. Action No. 8.10 (Improving inland waterways through prioritization of inland waterways projects and implementation of economic investment plan Flagship 1 projects) is only applicable in Bosnia and Herzegovina and Serbia, while Action No. 6.1. (Enable B2A multimodal data exchange through implementation of the e-FTI Regulation and Maritime Single Window environment) is mostly applicable in Albania (as many of the related activities are covered under Action 4.1 (Improving multimodality through transposition of intermodal/multimodal legislative framework)).

A short explanation regarding highest ranked Actions/Groups of Actions per RP is presented below:

### **Albania**

For Albania, the costs of implementation of all 67 Actions amounts to EUR 9,266.61 million. It is envisaged to be financed from central budget (9.04%), municipal/regional budgets (0.37%), publicly owned companies (1.15%), private sector (26,20%), donor support – TA (0.11%), donor support – Loans/ Grants (14.98%) and other sources (48.15%).

The Flagships with highest prioritisation in Albania are Flagship 1 (Boosting uptake of zero-emission vehicles, renewable & low-carbon fuels and related infrastructure) and Flagship 3 (Making interurban and urban mobility more sustainable and healthier), since all six Actions from Flagship 1 and all 4 Actions from Flagship 3 are in top 20 prioritised Actions/Groups of Actions. The next highest priority is Flagship 4 (Greening freight transport), with 5 out of 6 Actions in the top 20 prioritised Actions, followed by Flagship 6 (Making connected and automated multimodal mobility a reality) with 6 out of 11 Actions in the top 20 prioritised Actions/Groups of Actions. Actions from other Flagships are lower on prioritisation list Investment costs for the top 20 Actions/Groups of Actions for Albania amount to EUR 9,179.75 million.

### **Bosnia and Herzegovina**

For Bosnia and Herzegovina, the costs of implementation of all 67 Actions amounts to EUR 11,937.62 million. It is envisaged to be financed from central budget (13.48%), municipal/regional budgets (0.27%), publicly owned companies (0.90%), private sector (23.54%), donor support – TA (0.08%), donor support – Loans/ Grants (12.39%) and other sources (49.32%).

The Flagships with highest prioritisation in Bosnia and Herzegovina are Flagship 1 (Boosting uptake of zero-emission vehicles, renewable & low-carbon fuels and related infrastructure) and Flagship 3 (Making interurban and urban mobility more sustainable and healthy), since all six Actions from Flagship 1 and all 4 Actions from Flagship 3 are in the top 20 prioritised Actions/Groups of Actions. The next Flagship is Flagship 4 (Greening freight transport), with 5 out of 6 Actions in the top 20 prioritised, followed by Flagship 6 (Making connected and automated multimodal mobility a reality) with 6 out of 11 Actions in the top 20 prioritised Actions/Groups of Actions. Actions from other Flagships are lower on the prioritisation list. Investment costs for top 20 Actions/Action groups for Bosnia and Herzegovina amount to EUR 11,787.53 million.

### **Kosovo**

For Kosovo, the costs of implementation of all 67 Actions amounts to EUR 6,198.01 million. It is envisaged to be financed from central budget (9.43%), municipal/regional budgets (0.27%), publicly owned companies (1.39%), private sector (24.40%), donor support – TA (0.15%), donor support – Loans/ Grants (14.13%) and other sources (50.12%).

The Flagships with highest prioritisation in Kosovo are Flagship 1 (Boosting uptake of zero-emission vehicles, renewable & low-carbon fuels and related infrastructure) and Flagship 3 (Making interurban and urban mobility more sustainable and healthy), since all six Actions from Flagship 1 and all 4 Actions from Flagship 3 are in the top 20 prioritised Action groups. The next Flagship is Flagship 4 (Greening freight transport), with 5 out of 6 Actions in the top 20 prioritised Actions/Groups of Actions, followed by Flagship 6 (Making connected and automated multimodal mobility a reality) with 6 out of 11 Actions in the top 20 prioritised Actions/Groups of Actions. Actions from other Flagships are lower on prioritisation list Investment costs for top 20 Actions/Groups of Actions for Kosovo amount to EUR 6,139.87 million.

### **Montenegro**

For Montenegro, the costs of implementation of all 67 Actions amounts to EUR 4,810.24 million. It is envisaged to be financed from central budget (22.89%), municipal/regional budgets (0.15%), publicly owned companies (0.99%), private sector (16.12%), donor support – TA (0.21%), donor support – Loans/ Grants (27.84%) and other sources (31.80%).

The Flagships with highest prioritisation in Montenegro are Flagship 1 (Boosting uptake of zero-emission vehicles, renewable & low-carbon fuels and related infrastructure) and Flagship 3 (Making interurban and urban mobility more sustainable and healthy), since all six Actions from Flagship 1 and all 4 Actions from Flagship 3 are in the top 20 prioritised Actions/Groups of Actions. The next Flagship is Flagship 4 (Greening freight transport), with 5 out of 6 Actions in top 20 prioritised Actions, followed by Flagship 6 (Making connected and automated multimodal mobility a reality) with 6 out of 11 Actions in the top 20 prioritised Actions/Groups of Actions. Actions from other Flagships are lower on prioritisation list. Investment costs for the top 20 Actions/Groups of Actions for Montenegro amount to EUR 4,766.10 million.

### **North Macedonia**

For North Macedonia, the costs of implementation of all 67 Actions amounts to EUR 6,720.61 million. It is envisaged to be financed from central budget (11.85%), municipal/regional budgets (0.40%), publicly

owned companies (1.38%), private sector (29.25%), donor support – TA (0.14%), donor support – Loans/ Grants (13.85%) and other sources (43.13%).

The Flagships with highest prioritisation in North Macedonia are Flagship 1 (Boosting uptake of zero-emission vehicles, renewable & low-carbon fuels and related infrastructure) and Flagship 3 (Making interurban and urban mobility more sustainable and healthy), since all six Actions from Flagship 1 and all 4 Actions from Flagship 3 are in the top 20 prioritised Actions/Groups of Actions. The next Flagship is Flagship 4 (Greening freight transport), with 5 out of 6 Actions in top 20 prioritised Actions/Groups of Actions, followed by Flagship 6 (Making connected and automated multimodal mobility a reality) with 6 out of 11 Actions in top 20 prioritised Actions/Groups of Actions. Actions from other Flagships are lower on prioritisation list. Investment costs for the top 20 Actions/Groups of Actions for North Macedonia amount to EUR 6,662.29 million.

### Serbia

For Serbia, the costs of implementation of all 67 Actions amounts to EUR 28,929.47 million. It is envisaged to be financed from central budget (17.53%), municipal/regional budgets (0.74%), publicly owned companies (1.57%), private sector (27.85%), donor support – TA (0.3%), donor support – Loans/ Grants (12.39%) and other sources (39.88%).

The Flagships with highest prioritisation in Serbia are Flagship 1 (Boosting uptake of zero-emission vehicles, renewable & low-carbon fuels and related infrastructure) and Flagship 3 (Making interurban and urban mobility more sustainable and healthy), since all six Actions from Flagship 1 and all 4 Actions from Flagship 3 are in the top 20 prioritised Actions/Groups of Actions. The next Flagship is Flagship 4 (Greening freight transport), with 5 out of 6 Actions in the top 20 prioritised Actions/Groups of Actions, followed by Flagship 6 (Making connected and automated multimodal mobility a reality) with 6 out of 11 Actions in the top 20 prioritised Actions/Groups of Actions. Actions from other Flagships are lower on prioritisation list. Investment costs for top 20 Actions/Groups of Actions for Serbia amount to EUR 28,753.99 million.

The costs of implementation of the top 20 Actions/Groups of Actions identified for each RP are shown in the table below.

*Table 4-1 Investment and other requirements according to type of source for top 20 Action groups per RP (millions of EUR)*

RP	Central Budget (or entity level)	Municipal / regional budgets	Publicly owned companies	Private sector	Donor support - TA	Donor support - Loans/ Grants	Other	Total
Albania	€814.26	€33.89	€104.53	€2,421.59	€2.90	€1,340.84	€4,461.74	€9,179.75
Bosnia and Herzegovina	€1,570.53	€32.70	€107.04	€2,809.92	€2.80	€1,377.07	€5,887.46	€11,787.53
Kosovo	€567.35	€23.32	€85.36	€1,511.62	€2.35	€843.43	€3,106.44	€6,139.87
Montenegro	€1,089.69	€6.97	€44.97	€770.57	€2.76	€1,321.66	€1,529.48	€4,766.10
North Macedonia	€778.88	€27.07	€92.16	€1,965.01	€2.49	€898.27	€2,898.40	€6,662.29
Serbia	€5,020.72	€213.35	€453.08	€8,053.98	€3.26	€3,471.39	€11,538.21	€28,753.99

RP	Central Budget (or entity level)	Municipal / regional budgets	Publicly owned companies	Private sector	Donor support - TA	Donor support - Loans/ Grants	Other	Total
Total	€9,841.44	€337.30	€887.14	€17,532.70	€16.56	€9,252.66	€29,421.74	€67,289.52

The total costs for implementing all 67 Actions are presented in the table below – sorted according to RP along with an estimate as to the source of financing. These amounts mostly reflect amounts to be mobilised by the year 2030 – though some of the Actions also have significant investments expected afterwards. It can be noted that most of the budgets associated with implementation of the SSMS are included in the top 20 Actions/Groups of Actions. This is because these are the Actions/Groups of Actions which generally involve the largest investments in infrastructure development and vehicle replacement.

*Table 4-2 Investment and other requirements according to type of source for all 67 Actions (millions of EUR)*

RP	Central Budget (or entity level)	Municipal / regional budgets	Publicly owned companies	Private sector	Donor support - TA	Donor support - Loans/ Grants	Other	Total
Albania	€838.11	€34.46	€106.92	€2,427.53	€10.13	€1,387.72	€4,461.74	€9,266.62
Bosnia and Herzegovina	€1,609.77	€32.77	€107.63	€2,810.66	€9.99	€1,479.34	€5,887.46	€11,937.62
Kosovo	€584.59	€23.39	€85.99	€1,512.36	€9.60	€875.65	€3,106.44	€6,198.01
Montenegro	€1,101.28	€7.24	€47.40	€775.50	€9.99	€1,339.34	€1,529.48	€4,810.24
North Macedonia	€796.28	€27.14	€92.75	€1,965.75	€9.26	€931.03	€2,898.40	€6,720.61
Serbia	€5,072.37	€213.42	€454.64	€8,056.06	€9.85	€3,584.91	€11,538.21	€28,929.47
<b>Total</b>	<b>€10,002.40</b>	<b>€338.42</b>	<b>€895.34</b>	<b>€17,547.87</b>	<b>€58.82</b>	<b>€9,597.99</b>	<b>€29,421.74</b>	<b>€67,862.57</b>

The total amount – almost 68 billion would be spread across all 6 RPs with the heaviest investments in:

- 1.5 Encouraging the introduction of incentives for zero-emission vehicles: EUR 24.6 billion – mostly from private sources (vehicle buyers) but with some incentives from governments,
- 1.1 Transposition of alternative fuel directive: EUR 12 billion – mostly from private sources (charging station owners),
- 3.1 Encourage regional capitals and assist in defining sustainable urban mobility solutions for the major urban nodes along the core network (last mile solutions): EUR 5.6 billion – including major investments by the cities themselves but likely with central government involvement,
- 8.7 Electrification of the rail core network and implementation of Flagship 1, 2, 3: EUR 9 billion – likely requiring public investment since the investments are not profitable,
- 4.3 Ensuring road/rail connections to TEN-T ports/ airports, freight terminals, and removing bottlenecks for intermodal transport: EUR 7.7 billion – mostly with public investment,

- 1.4 Aligning the emission standards across the region, by setting the minimum standard for new cars at EURO6: EUR 4.9 billion – mostly from private sources (vehicle buyers),
- 8.12 Open Public Funds for Railway Fleet Renewal for Passenger and Freight transport: EUR 1.42 billion – to be supported via loans / grants to railway companies and central budget support,
- 6.8 Initiating deployment of 5G transport corridors across region on Core and Comprehensive Network: EUR 1 billion – mostly through private sector investments,
- 8.10 Improving inland waterways through prioritisation of INLAND WATERWAYS projects and Implementation of economic investment plan Flagship 1 projects: EUR 377 million – expected to be mostly from public sources though with private sector cooperation,
- 8.8 Improvement of road and rail border crossings / common crossings (removal of administrative bottlenecks, additional parking lanes, construction of joint BCPs/CCPs): EUR 224 million – expected to be mostly from public sources or donors,
- 8.5 Developing and implementing climate resilience plans for RPs transport networks: EUR 110 million – mostly related to the marginal increased costs of investments for climate resilience.

It is noteworthy that there are significant TA requirements that have been identified in order to implement all 67 Actions – over EUR 58 million through 2030. These amounts are spread out throughout the different Actions. In particular, TA related to key investment and priority Actions is necessary in the coming years.



## 5 Conclusions

Supporting the global response to the treat of climate change requires also urgent the development of sustainable and clean transport systems, The prospect for this is promising as innovation and technological progress in recent years have led to the significant advances in e-mobility, use of alternative fuels, fuels efficiency, promotion of green transport modes, etc.

The SSMS for the Western Balkans have been developed in line with the EU policy in this filed, and therefore relevant measures have been proposed within the Actions plan.

Several key actions identified which combined would have significant impact on the projected GHG emissions and energy consumption of the transport system in the WB6 region. These include Actions to:

- improve the infrastructure for alternative fuels (electric vehicle charging, potentially hydrogen refuelling, etc.),
- encourage the transition of the fleet from internal combustion engines to zero-emission vehicles and / or sustainable fuels,
- dramatically shift modal shares towards public transportation, rail, IWW and maritime transport, and multimodal – this would need to happen within cities, in between cities, and across the TEN-T network – and would involve better rail connections, improved multimodal transport, etc.

Achieving the targets of the SSMS will necessitate significant efforts at:

- creating an appropriate regulatory environment,
- facilitating flow of information and improving capacities,
- setting up an incentives program for promoting sustainable transport mobility,
- investing in the appropriate infrastructure and vehicle fleets to allow for a low-carbon transition,
- cooperation among RPs in driving forward the transportation of the transport sector, which should support sustainable continuity,
- the awareness raising among the WB6 population of the importance of the use of sustainable transport modes, and
- setting up forums and workshops addressing the social, environmental, and economic challenges related to the WB6/global development of zero emissions/sustainable transport.

The total costs for implementing all 67 Actions are presented below – sorted according to RP.

- Albania EUR 9.2 billion.
- Bosnia and Herzegovina EUR 11.9 billion
- Kosovo EUR 6.2 billion.
- Montenegro EUR 4.8 billion.
- North Macedonia EUR 6.7 billion
- Serbia 28.9 billion

These amounts mostly reflect amounts to be mobilised by the year 2030 – though some of the Actions also have significant investments expected afterwards. It can be noted that most of the budgets associated with implementation of the SSMS are included in the top 20 Action groups. This is because these are the Actions which generally involve the largest investments in infrastructure development and vehicle replacement

The total amount – almost 68 billion would be spread across all 6 RPs with the heaviest investments in:

- 1.5 Encouraging the introduction of incentives for zero-emission vehicles: EUR 24.6 billion – mostly from private sources (vehicle buyers) but with some incentives from governments,
- 1.1 Transposition of alternative fuel directive: EUR 12 billion – mostly from private sources (charging station owners),
- 3.1 Encourage regional capitals and assist in defining sustainable urban mobility solutions for the major urban nodes along the core network (last mile solutions): EUR 5.6 billion – including major investments by the cities themselves but likely with central government involvement,
- 8.7 Electrification of the rail core network and implementation of Flagship 1, 2, 3: EUR 9 billion – likely requiring public investment since the investments are not profitable,
- 4.3 Ensuring road/rail connections to TEN-T ports/ airports, freight terminals, and removing bottlenecks for intermodal transport: EUR 7.7 billion – mostly with public investment,
- 1.4 Aligning the emission standards across the region, by setting the minimum standard for new cars at EURO6: EUR 4.9 billion – mostly from private sources (vehicle buyers),
- 8.12 Open Public Funds for Railway Fleet Renewal for Passenger and Freight transport: EUR 1.42 billion – to be supported via loans / grants to railway companies and central budget support,
- 6.8 Initiating deployment of 5G transport corridors across region on Core and Comprehensive Network: EUR 1 billion – mostly through private sector investments,
- 8.10 Improving inland waterways through prioritisation of INLAND WATERWAYS projects and Implementation of economic investment plan Flagship 1 projects: EUR 377 million – expected to be mostly from public sources though with private sector cooperation,
- 8.8 Improvement of road and rail border crossings / common crossings (removal of administrative bottlenecks, additional parking lanes, construction of joint BCPs/CCPs): EUR 224 million – expected to be mostly from public sources or donors,
- 8.5 Developing and implementing climate resilience plans for RPs transport networks: EUR 110 million – mostly related to the marginal increased costs of investments for climate resilience.

It is noteworthy that there are significant TA requirements that have been identified in order to implement all 67 Actions – over EUR 58 million through 2030. These amounts are spread out throughout the different Actions. In particular, TA related to key investment and priority Actions is necessary in the coming years.

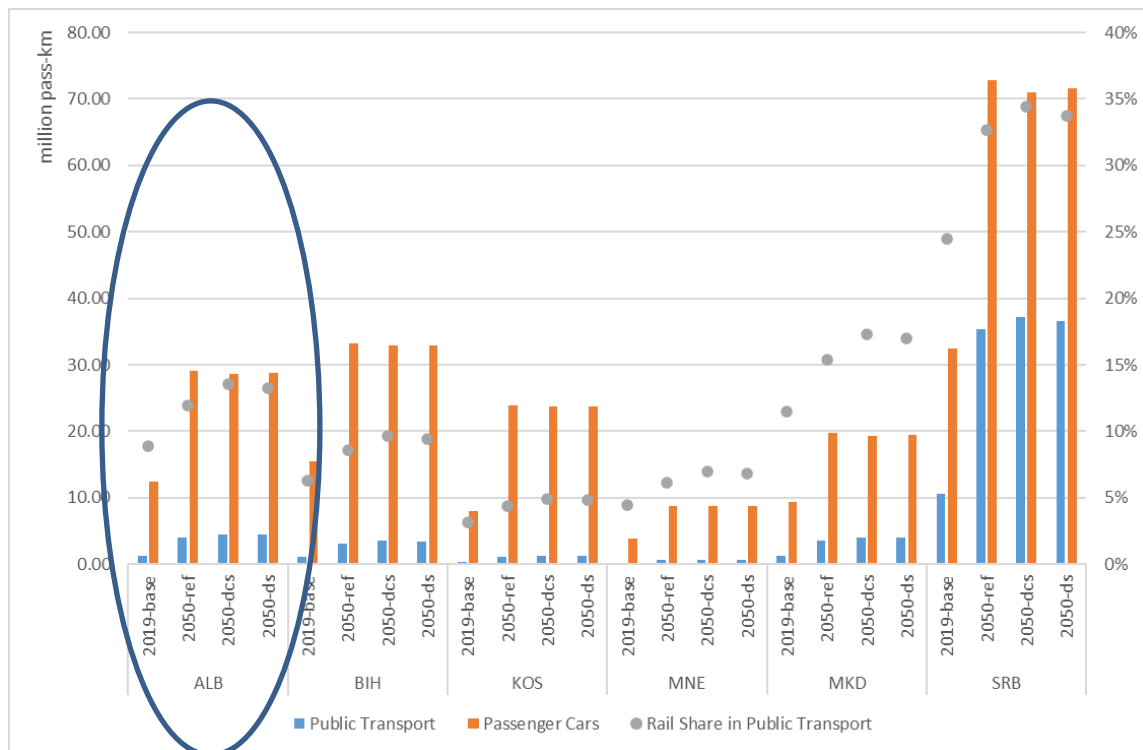
Key results that will be achieved by implementing abovementioned investments:

- A reduction of GHG from 18.1 million tCO<sub>2</sub>eq/year in 2050 in the Do-Nothing scenario to 7.4 million tCO<sub>2</sub>eq/year in the Decarbonisation scenario.
- A reduction of final energy consumption from 60,925 GWh per year in 2050 in the Do-Nothing Scenario to 15,607 GWh per year in the Decarbonisation scenario.
- Reductions in fuel costs of over EUR 7 billion in 2050 (per year) and cumulative savings of almost EUR 100 billion through 2050.

## Annex No.1 RP Analysis

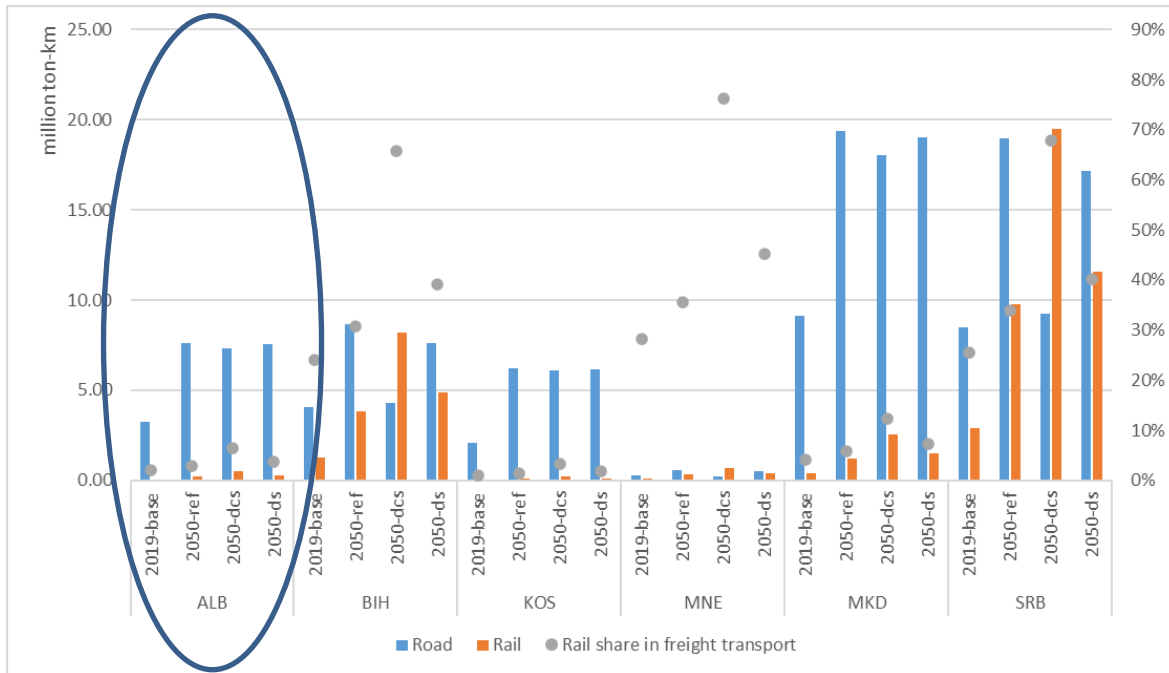
### Albania

Albania's transport sector is – as common in all the RPs - characterized by road-dominated transport with insufficient multi-modal and railway linkages. The breakdown of the estimated passenger-km and tonne-km in the base year (2019) and projections to 2050 are included in the two figures below. It can be noticed that the total amount of passenger-km are expected to more than double in the coming decades - which would put more stress on the transport system and result in increased energy consumption and associated GHGs if significant Actions are not taken.



\* base = Base year, ref = Reference scenario / Do Nothing scenario,  
ds = Do Something scenario, dcs = Decarbonisation scenario

Figure ALB-1 Passenger traffic and mode share on the level of RP in the Base year (2019) - Do Nothing, Do Something, and Decarbonisation scenarios (in million passenger-kilometres per year)



\* base = Base year, ref = Reference scenario / Do Nothing scenario, ds = Do Something scenario, dcs = Decarbonisation scenario

Figure ALB-2 Freight traffic and mode share on the level of RP – Do Nothing, Do Something, and Decarbonisation scenarios (in million tonne-kilometres per year)

Albania has the cleanest power of the region as 100% of its electricity is produced by hydropower, which means that shifting to electric vehicles decreases dramatically the associated GHG emissions. The main challenge is responding to the increasing demand that EVs will have in the near future using clean energy sources. Additional production would need to come on line to accommodate increased demand. The table below outlines the estimated share of electric vehicles in the decarbonization scenario according to type of transport.

Table ALB-1 Electrification level in road transport for the decarbonisation scenario per type of transport in Albania

Car				Bus				LCV				HCV			
2019	2030	2040	2050	2019	2030	2040	2050	2019	2030	2040	2050	2019	2030	2040	2050
0%	10%	60%	90%	0%	5%	50%	90%	0%	5%	50%	90%	0%	5%	50%	90%

According to the scoring carried out, the following 20 Action Groups can be considered a priority for Albania.

Ranking	Action Group	Associated overall budget (EUR)	Notes
1	1.1. Transposition of alternative fuel directive 1.2. Deployment of e charging stations on the busiest corridors	1,813,427,512	Mostly private financing sources
2	4.1. Improving multimodality through transposition of intermodal/multimodal legislative framework	70,000	Mostly a technical assistance activity
3	1.4. Aligning the emission standards across the region, by setting the minimum standard for new cars at EURO6 1.6. Improve emission testing in roadworthiness checks	528,300,000	Government resources for the framework, linked to procurement and significant private investment
4	4.6. Rail Corridor Initiative – Western Balkans to join the Rail Freight Corridors	300,000	Mostly a technical assistance activity
5	4.2. Assessment of bottlenecks in modal interconnections and the current incentive system in place 4.3. Ensuring road/rail connections to TEN-T ports/ airports, freight terminals , and removing bottlenecks for intermodal transport 4.4. Construction of intermodal terminals and purchase of related equipment	1,375,900,000	Likely significant public investment / donor / lending contributions needed
6	3.1. Encourage regional capitals and assist in defining sustainable urban mobility solutions for the major urban nodes along the core network (last mile solutions)	559,835,000	Involves several activities as defined by Green City Action Plan / Sustainable Urban Mobility Plan
7	3.2. Introduction of regionally aligned Public Service Obligation for international passenger rail transport	660,000	Mostly a technical assistance activity – but linked to significant investments
8	3.3. Better manage and coordinate international rail traffic, including if necessary, through revised rules for capacity allocation and infrastructure charging in rail	980,000	Mostly a technical assistance activity
9	6.7. Deployment of Mobility as a Service (pax and freight) applications and digital transport corridors, smart mobility solutions and multimodal travel information services	2,000,000	Technical assistance and government resources for procurement – linked to eventual investment
10	2.2. Setting the foundation for deployment of alternative fuels infrastructure through transposition of relevant EU acquis in the air and waterborne sectors	150,000	Technical assistance and government resources– linked to eventual investment
11	3.4. Transposition of the Provisions of the Fourth Railway Package	150,000	Mostly a technical assistance/ policy activity
12	6.1. Enable B2A multimodal data exchange through implementation of the e-FTI Regulation and Maritime Single Window environment	1,100,000	Mostly through donor support and government funding
13	1.5. Encouraging the introduction of incentives for zero-emission vehicles	3,942,548,611	Mostly private sources (vehicle buyers) but some public subsidies
14	6.9. Enable environment for multimodal ticketing in passenger transport and transpose relevant legislation.	200,000	Mostly a technical assistance/ policy activity
15	6.3. Initiation of deployment of ERTMS through transposition of EU directives, TSIs, preparation of project documentation and deployment	200,000	Mostly a technical assistance/ policy activity
16	6.8. Initiating deployment of 5G transport corridors across region on Core and Comprehensive Network	166,666,667	Mostly private investments (companies)

Ranking	Action Group	Associated overall budget (EUR)	Notes
17	8.9. Reforming the railway sector through transposition and implementation of Market opening, passenger rights, interoperability, border crossings/ common crossings legislation	140,000	Mostly a technical assistance/ policy activity
18	5.2. Adopt and implement guidelines for operators and platforms to inform passengers about the carbon footprint of their trip and to enable passengers to voluntarily offset it, and for wider use of eco-routing for (in-built) navigation software	150,000	Mostly a technical assistance activity
19	8.12. Open Public Funds for Railway Fleet Renewal for Passenger and Freight transport	212,400,000	Mix of public funds, donor / lending, and companies
20	8.7. Electrification of the rail core network and implementation of Flagship 1, 2, 3	539,170,507	Mix of public funds, donor / lending, and companies

The key Actions which combine to have a huge impact on the projected greenhouse gas emissions and energy consumption of the transport system in Albania include the following key directions:

- improve the infrastructure for alternative fuels (electric vehicle charging, potentially hydrogen refuelling, etc.)
- encourage the transition of the fleet from internal combustion engines to zero-emission vehicles and / or sustainable fuels
- dramatically shift modal shares towards public transportation, rail, waterway transport, and multi-modal – this would need to happen within cities, in between cities, and across the TEN-T network – and would involve better rail connections, improved multi-modal transport, etc.

The costs of implementation of the top 20 Actions identified for Albania are shown in the table below.

*Table ALB-2 Investment and other requirements according to type of source for top 20 Action Groups for Albania (millions of EUR)*

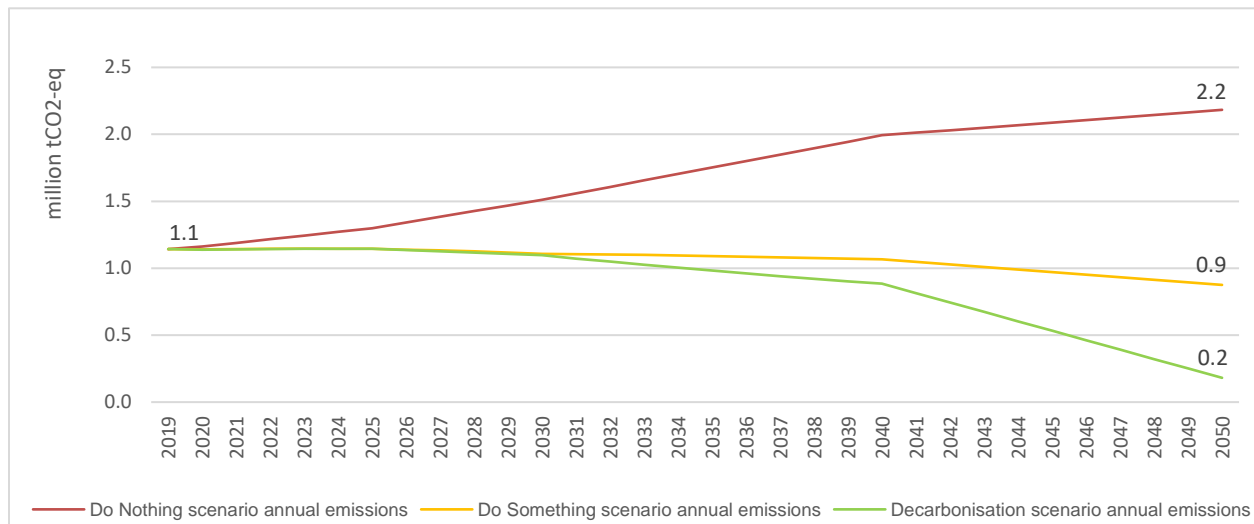
RP	Central Budget (or entity level)	Municipal / regional budgets	Publicly owned companies	Private sector	Donor support - TA	Donor support - Loans/ Grants	Other	Total
Albania	€814.26	€33.89	€104.53	€2,421.59	€2.90	€1,340.84	€4,461.74	€9,179.75

The total costs for implementing all 67 Actions are presented in the table below along with an estimate as to the source of financing. These amounts mostly reflect amounts to be mobilised by the year 2030 – though some of the Actions also have significant investments expected afterwards. It can be noted that most of the budgets associated with implementation of the SSMS are included in the top 20 Action groups. This is because these are the Actions which generally involve the largest investments in infrastructure development and vehicle replacement.

*Table ALB-3 Investment and other requirements according to type of source for all 67 Actions (millions of EUR)*

RP	Central Budget (or entity level)	Municipal / regional budgets	Publicly owned companies	Private sector	Donor support - TA	Donor support - Loans/ Grants	Other	Total
Albania	€838.11	€34.46	€106.92	€2,427.53	€10.13	€1,387.72	€4,461.74	€9,266.62

In carrying out the Actions of the Strategy and achieving the targets of the Strategy at the RP level, the GHG emissions from the transport sector in Albania are projected to decrease significantly – from an estimated 1.1 million tCO<sub>2</sub>eq in the system analysed to 0.2 million tCO<sub>2</sub>eq in 2050.

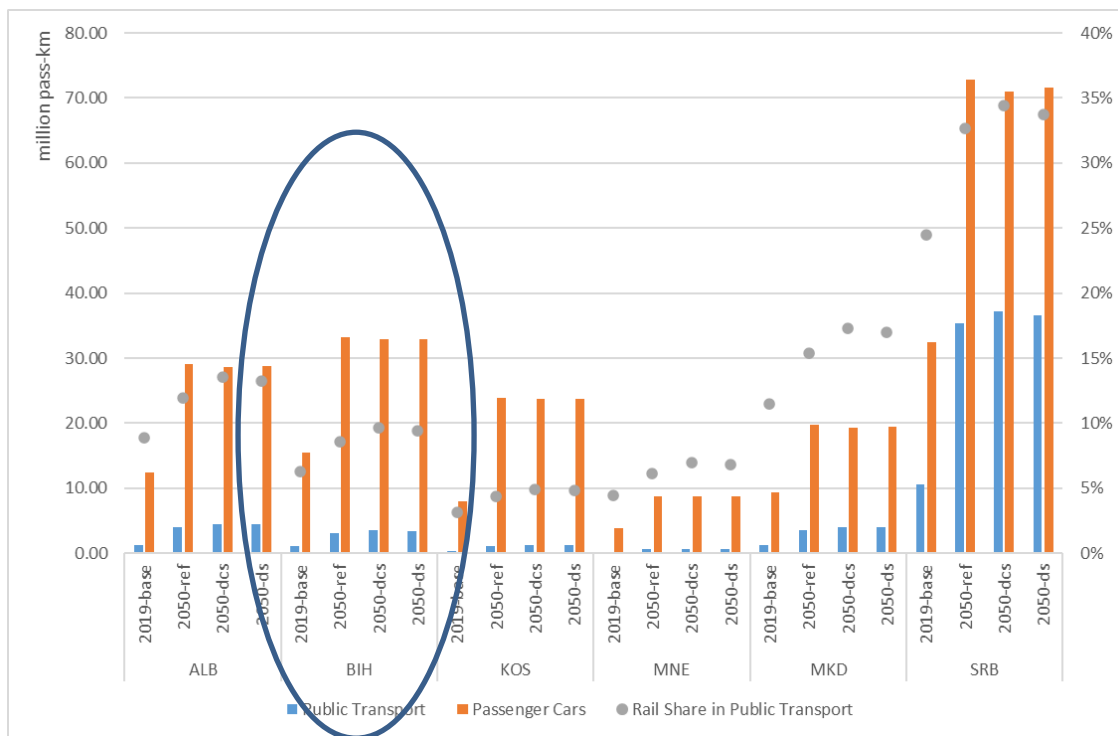


*Figure ALB-3 Albania CO<sub>2</sub> emissions estimations for the different scenarios between 2019 – 2050 (million tonnes CO<sub>2</sub>-eq per year)*

In switching fuels towards electricity and away from petroleum products, as well as increasing the efficiency of the transport system in general, the projected savings in fuel costs would be EUR 1.1 billion in 2050 and over EUR 14.6 billion in cumulative savings through 2050.

## Bosnia and Herzegovina

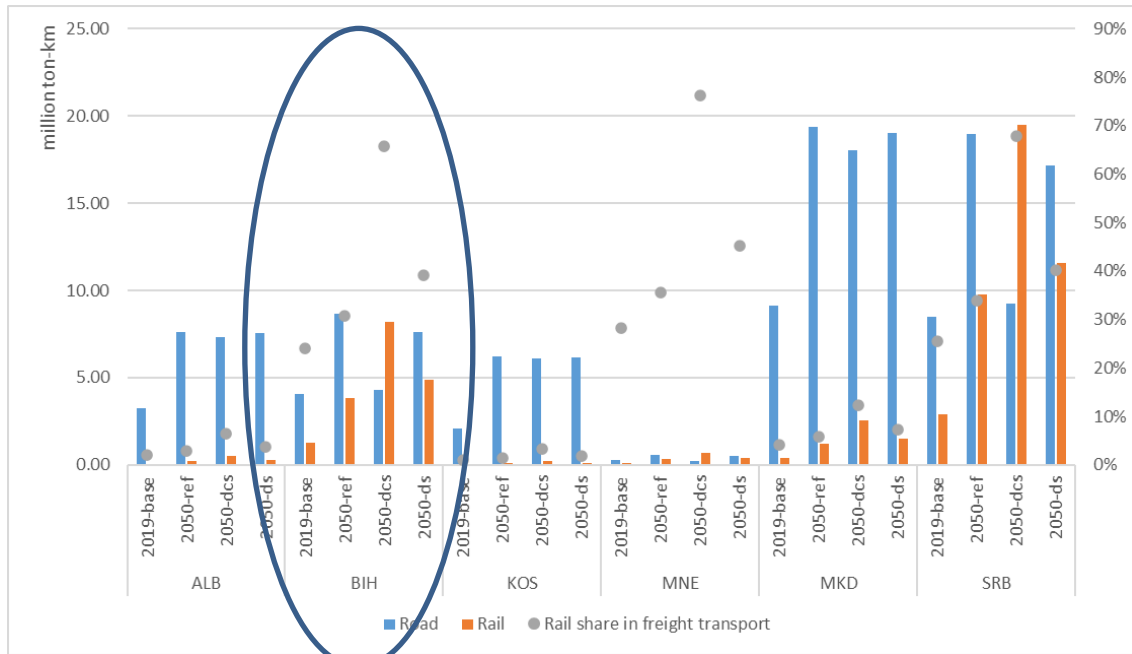
Bosnia and Herzegovina's transport sector is – as common in all the RPs - characterized by road-dominated transport with insufficient multi-modal and railway linkages. The breakdown of the estimated passenger-km and tonne-km in the base year (2019) and projections to 2050 are included in the two figures below. It can be noticed that the total amount of passenger-km are expected to more than double in the coming decades - which would put more stress on the transport system and result in increased energy consumption and associated GHGs if significant Actions are not taken.



\* base = Base year, ref = Reference scenario / Do Nothing scenario, ds = Do Something scenario, dcs = Decarbonisation scenario

Figure BIH-4 Passenger traffic and mode share on the level of RP in the Base year (2019) - Do Nothing, Do Something, and Decarbonisation scenarios (in million passenger-kilometres per year)





\* base = Base year, ref = Reference scenario / Do Nothing scenario, ds = Do Something scenario, dcs = Decarbonisation scenario

Figure BIH-5 Freight traffic and mode share on the level of RP – Do Nothing, Do Something, and Decarbonisation scenarios (in million tonne-kilometres per year)

Bosnia and Herzegovina has a very coal-centred mix in electricity production – wherein the grid emissions factor is approximately 0.74 tCO<sub>2</sub>eq per MWh – which is almost 3x that of the average EU. This means that shifting to electric vehicles would only slightly decrease the associated GHG emissions. The main challenge for decarbonisation of the sector will also therefore include decarbonisation of the energy sector – in addition to responding to the increasing demand that EVs will have in the near future using clean energy sources. Additional production would need to come on line to accommodate increased demand. The table below outlines the estimated share of electric vehicles in the decarbonization scenario according to type of transport.

Table BIH-4 Electrification level in road transport for the decarbonisation scenario per type of transport in Bosnia and Herzegovina

Car				Bus				LCV				HCV			
2019	2030	2040	2050	2019	2030	2040	2050	2019	2030	2040	2050	2019	2030	2040	2050
0%	10%	60%	90%	0%	5%	50%	90%	0%	5%	50%	90%	0%	5%	50%	90%

According to the scoring carried out, the following 20 Action groups can be considered a priority for Bosnia and Herzegovina.

Ranking	Action Group	Associated overall budget (EUR)	Notes
1	1.1. Transposition of alternative fuel directive 1.2. Deployment of e charging stations on the busiest corridors	2,211,849,857	Mostly private financing sources
2	4.1. Improving multimodality through transposition of intermodal/multimodal legislative framework	70,000	Mostly a technical assistance activity
3	1.4. Aligning the emission standards across the region, by setting the minimum standard for new cars at EURO6 1.6. Improve emission testing in roadworthiness checks	1,086,848,160	Government resources for the framework, linked to procurement and significant private investment
4	4.6. Rail Corridor Initiative – Western Balkans to join the Rail Freight Corridors	300,000	Mostly a technical assistance activity
5	4.2. Assessment of bottlenecks in modal interconnections and the current incentive system in place 4.3. Ensuring road/rail connections to TEN-T ports/airports, freight terminals, and removing bottlenecks for intermodal transport 4.4. Construction of intermodal terminals and purchase of related equipment	1,214,500,000	Likely significant public investment / donor / lending contributions needed
6	3.1. Encourage regional capitals and assist in defining sustainable urban mobility solutions for the major urban nodes along the core network (last mile solutions)	660,000	Involves several activities as defined by Green City Action Plan / Sustainable Urban Mobility Plan
7	8.10. Improving inland waterways through prioritisation of INLAND WATERWAYS projects and Implementation of economic investment plan Flagship 1 projects	9,680,000	Mostly a technical assistance activity – but linked to significant investments
8	3.2. Introduction of regionally aligned Public Service Obligation for international passenger rail transport	660,000	Mostly a technical assistance activity – but linked to significant investments
9	3.3. Better manage and coordinate international rail traffic, including if necessary, through revised rules for capacity allocation and infrastructure charging in rail	980,000	Mostly a technical assistance activity
10	6.7. Deployment of Mobility as a Service (pax and freight) applications and digital transport corridors, smart mobility solutions and multimodal travel information services	2,000,000	Technical assistance and government resources for procurement – linked to eventual investment
11	2.2. Setting the foundation for deployment of alternative fuels infrastructure through transposition of relevant EU acquis in the air and waterborne sectors	150,000	Technical assistance and government resources– linked to eventual investment
12	3.4. Transposition of the Provisions of the Fourth Railway Package.	150,000	Mostly a technical assistance/ policy activity
13	1.5. Encouraging the introduction of incentives for zero-emission vehicles	4,811,616,306	Mostly private sources (vehicle buyers) but some public subsidies
14	6.9. Enable environment for multimodal ticketing in passenger transport and transpose relevant legislation.	200,000	Mostly a technical assistance/ policy activity
15	6.3. Initiation of deployment of ERTMS through transposition of EU directives, TSIs, preparation of project documentation and deployment	200,000	Mostly a technical assistance/ policy activity

Ranking	Action Group	Associated overall budget (EUR)	Notes
16	6.4. Deployment of ITS through transposition of EU directives, standards, preparation of project documentation and deployment	21,000,000	Mostly a technical assistance/ policy activity – linked to significant investments
17	8.12. Open Public Funds for Railway Fleet Renewal for Passenger and Freight transport	212,400,000	Mix of public funds, donor / lending, and companies
18	1.3. Undertake feasibility study on the use of hydrogen on trucks along the busiest corridors	28,746,524	Initial TA linked to a mix of public funds, donor / lending, and companies
19	6.8. Initiating deployment of 5G transport corridors across region on Core and Comprehensive Network	166,666,667	Mostly private investments (companies)
20	8.7. Electrification of the rail core network and implementation of Flagship 1, 2, 3	1,479,262,673	Mix of public funds, donor / lending, and companies

The key Actions which combine to have a huge impact on the projected greenhouse gas emissions and energy consumption of the transport system in Bosnia and Herzegovina include the following key directions:

- improve the infrastructure for alternative fuels (electric vehicle charging, potentially hydrogen refuelling, etc.)
- encourage the transition of the fleet from internal combustion engines to zero-emission vehicles and / or sustainable fuels
- dramatically shift modal shares towards public transportation, rail, waterway transport, and multi-modal – this would need to happen within cities, in between cities, and across the TEN-T network – and would involve better rail connections, improved multi-modal transport, etc.

The costs of implementation of the top 20 Action groups identified for Bosnia and Herzegovina are shown in the table below.

*Table BIH-5 Investment and other requirements according to type of source for top 20 Action groups for Bosnia and Herzegovina (millions of EUR)*

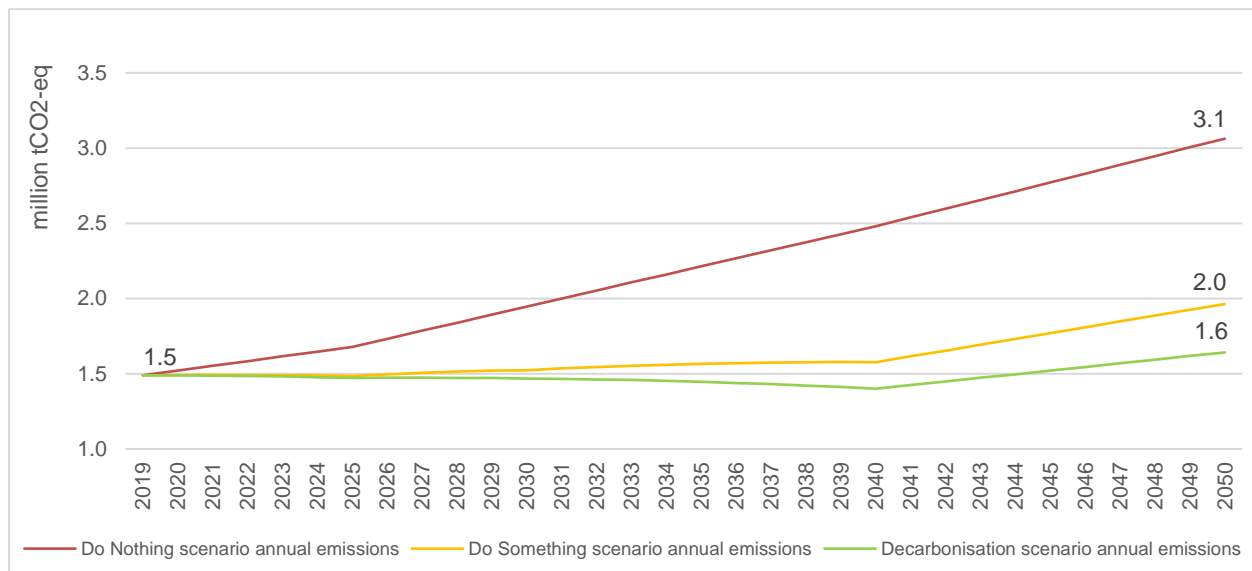
RP	Central Budget (or entity level)	Municipal / regional budgets	Publicly owned companies	Private sector	Donor support - TA	Donor support - Loans/ Grants	Other	Total
Bosnia and Herzegovina	€1,570.53	€32.70	€107.04	€2,809.92	€2.80	€1,377.07	€5,887.46	€11,787.53

The total costs for implementing all 67 Actions are presented in the table below along with an estimate as to the source of financing. These amounts mostly reflect amounts to be mobilised by the year 2030 – though some of the Actions also have significant investments expected afterwards. It can be noted that most of the budgets associated with implementation of the SSMS are included in the top 20 Action groups. This is because these are the Actions which generally involve the largest investments in infrastructure development and vehicle replacement.

*Table BIH-6 Investment and other requirements according to type of source for all 67 Actions (millions of EUR)*

RP	Central Budget (or entity level)	Municipal / regional budgets	Publicly owned companies	Private sector	Donor support - TA	Donor support - Loans/ Grants	Other	Total
Bosnia and Herzegovina	€1,609.77	€32.77	€107.63	€2,810.66	€9.99	€1,479.34	€5,887.46	€11,937.62

In carrying out the Actions of the Strategy and achieving the targets of the Strategy at the RP level, the GHG emissions from the transport sector in Bosnia and Herzegovina are projected to still increase slightly due to the high grid emissions factor for electricity – from an estimated 1.5 million tCO<sub>2</sub>eq in the system analysed to 1.6 million tCO<sub>2</sub>eq in 2050.

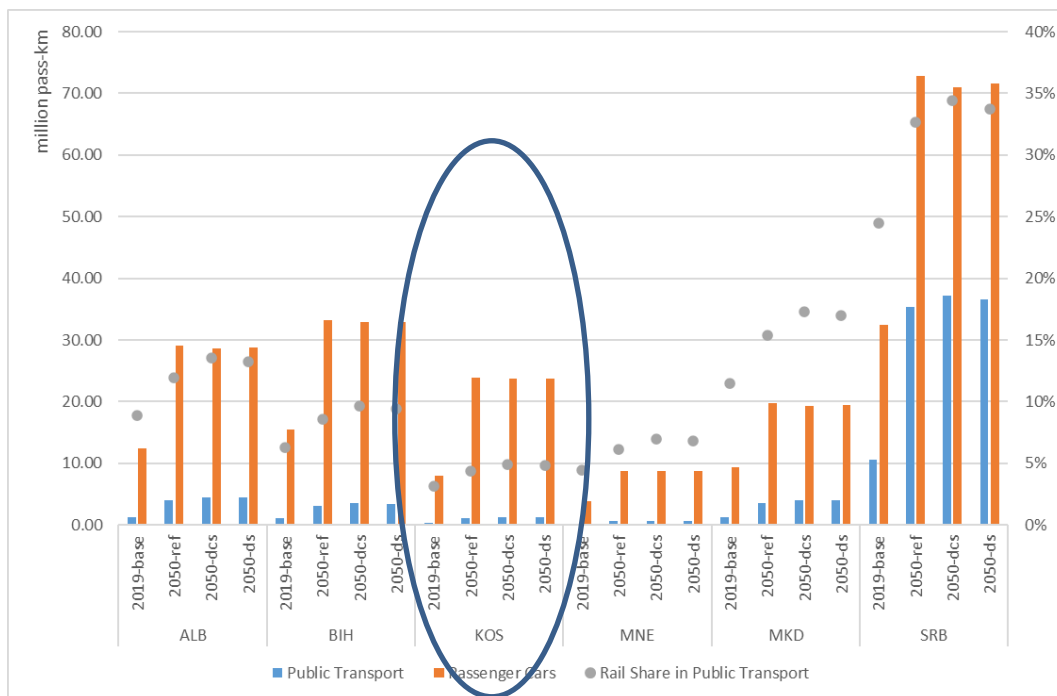


*Figure BIH-6 – Bosnia and Herzegovina CO<sub>2</sub> emissions estimations for the different scenarios between 2019 – 2050 (million tonnes CO<sub>2</sub>-eq per year)*

In switching fuels towards electricity and away from petroleum products, as well as increasing the efficiency of the transport system in general, the projected savings in fuel costs would be EUR 1.2 billion in 2050 and over EUR 18.6 billion in cumulative savings through 2050.

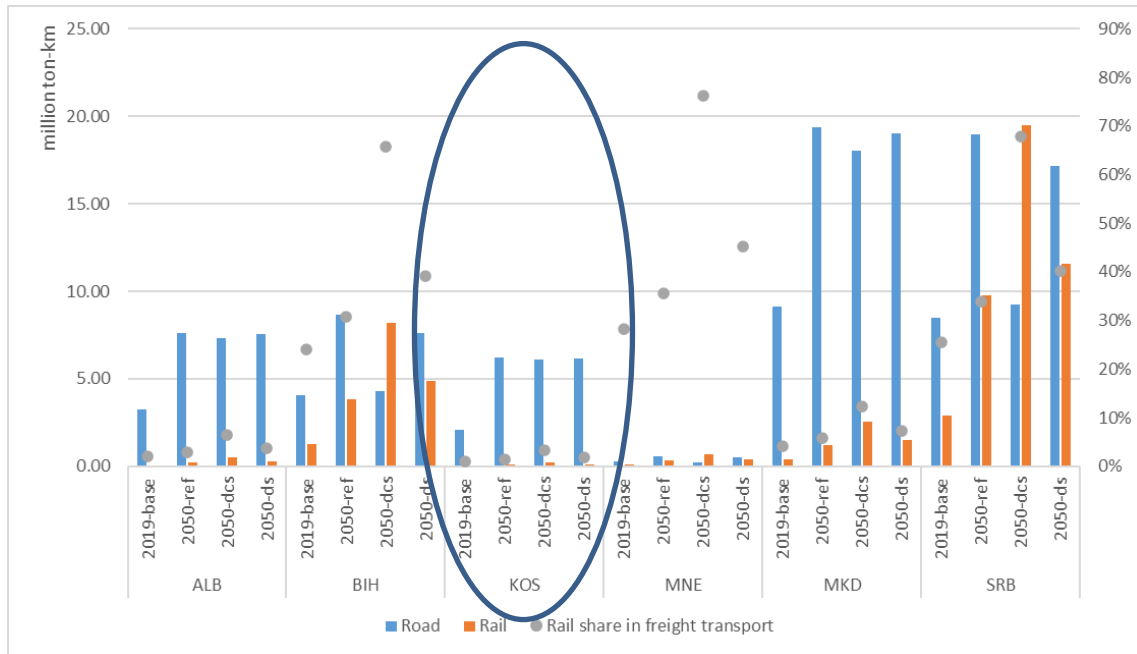
## Kosovo

Kosovo's transport sector is – as common in all the RPs - characterized by road-dominated transport with insufficient multi-modal and railway linkages. The breakdown of the estimated passenger-km and tonne-km in the base year (2019) and projections to 2050 are included in the two figures below. It can be noticed that the total amount of passenger-km are expected to more than double in the coming decades - which would put more stress on the transport system and result in increased energy consumption and associated GHGs if significant Actions are not taken. It should also be noticed, however, that even in the decarbonization scenario, rail is not expected to be a significant portion of the transport sector (less than 10%).



\* base = Base year, ref = Reference scenario / Do Nothing scenario,  
ds = Do Something scenario, dcs = Decarbonisation scenario

Figure KOS-7 Passenger traffic and mode share on the level of RP in the Base year (2019) - Do Nothing, Do Something, and Decarbonisation scenarios (in million passenger-kilometres per year)



\* base = Base year, ref = Reference scenario / Do Nothing scenario, ds = Do Something scenario, dcs = Decarbonisation scenario

Figure KOS-8 Freight traffic and mode share on the level of RP – Do Nothing, Do Something, and Decarbonisation scenarios (in million tonne-kilometres per year)

Kosovo has a very coal-centred mix in electricity production – wherein the grid emissions factor is approximately 0.84 tCO<sub>2</sub>eq per MWh – which is over 3x that of the average EU, which means that shifting to electric vehicles decreases would only slightly decrease the associated GHG emissions. The main challenge for decarbonisation of the sector will also therefore include decarbonisation of the energy sector – in addition to responding to the increasing demand that EVs will have in the near future using clean energy sources. Additional production would need to come on line to accommodate increased demand. The table below outlines the estimated share of electric vehicles in the decarbonization scenario according to type of transport.

Table KOS-7 Electrification level in road transport for the decarbonisation scenario per type of transport in Kosovo

Car				Bus				LCV				HCV			
2019	2030	2040	2050	2019	2030	2040	2050	2019	2030	2040	2050	2019	2030	2040	2050
0%	10%	60%	90%	0%	5%	50%	90%	0%	5%	50%	90%	0%	5%	50%	90%

According to the scoring carried out, the following 20 Action groups can be considered a priority for Kosovo.

Ranking	Action Group	Associated overall budget (EUR)	Notes
1	1.1. Transposition of alternative fuel directive 1.2. Deployment of e charging stations on the busiest corridors	1,042,556,085	Mostly private financing sources
2	4.1. Improving multimodality through transposition of intermodal/multimodal legislative framework	70,000	Mostly a technical assistance activity
3	1.4. Aligning the emission standards across the region, by setting the minimum standard for new cars at EURO6 1.6. Improve emission testing in roadworthiness checks	326,700,000	Government resources for the framework, linked to procurement and significant private investment
4	4.6. Rail Corridor Initiative – Western Balkans to join the Rail Freight Corridors	300,000	Mostly a technical assistance activity
5	4.2. Assessment of bottlenecks in modal interconnections and the current incentive system in place 4.3. Ensuring road/rail connections to TEN-T ports/ airports, freight terminals , and removing bottlenecks for intermodal transport 4.4. Construction of intermodal terminals and purchase of related equipment	801,700,000	Likely significant public investment / donor / lending contributions needed
6	3.1. Encourage regional capitals and assist in defining sustainable urban mobility solutions for the major urban nodes along the core network (last mile solutions)	383,594,712	Involves several activities as defined by Green City Action Plan / Sustainable Urban Mobility Plan
7	3.2. Introduction of regionally aligned Public Service Obligation for international passenger rail transport	660,000	Mostly a technical assistance activity – but linked to significant investments
8	3.3. Better manage and coordinate international rail traffic, including if necessary, through revised rules for capacity allocation and infrastructure charging in rail	980,000	Mostly a technical assistance activity
9	6.7. Deployment of Mobility as a Service (pax and freight) applications and digital transport corridors, smart mobility solutions and multimodal travel information services	2,000,000	Technical assistance and government resources for procurement – linked to eventual investment
10	3.4. Transposition of the Provisions of the Fourth Railway Package	150,000	Mostly a technical assistance/ policy activity
11	1.5. Encouraging the introduction of incentives for zero-emission vehicles	2,786,345,116	Mostly private sources (vehicle buyers) but some public subsidies
12	6.9. Enable environment for multimodal ticketing in passenger transport and transpose relevant legislation.	200,000	Mostly a technical assistance/ policy activity
13	6.3. Initiation of deployment of ERTMS through transposition of EU directives, TSIs, preparation of project documentation and deployment	200,000	Mostly a technical assistance/ policy activity
14	6.4. Deployment of ITS through transposition of EU directives, standards, preparation of project documentation and deployment	9,000,000	Mostly a technical assistance/ policy activity – linked to significant investments
15	8.12. Open Public Funds for Railway Fleet Renewal for Passenger and Freight transport	212,400,000	Mix of public funds, donor / lending, and companies
16	1.3. Undertake feasibility study on the use of hydrogen on trucks along the busiest corridors	15,705,326	Initial TA linked to a mix of public funds, donor / lending, and companies

Ranking	Action Group	Associated overall budget (EUR)	Notes
17	6.8. Initiating deployment of 5G transport corridors across region on Core and Comprehensive Network	166,666,667	Mostly private investments (companies)
18	8.9. Reforming the railway sector through transposition and implementation of Market opening, passenger rights, interoperability, border crossings/ common crossings legislation	140,000	Mostly a technical assistance/ policy activity
19	5.2. Adopt and implement guidelines for operators and platforms to inform passengers about the carbon footprint of their trip and to enable passengers to voluntarily offset it, and for wider use of eco-routing for (in-built) navigation software	150,000	To be covered under existing processes
20	8.7. Electrification of the rail core network and implementation of Flagship 1, 2, 3	390,552,995	Mix of public funds, donor / lending, and companies

The key Actions which combine to have a huge impact on the projected greenhouse gas emissions and energy consumption of the transport system in Kosovo include the following key directions:

- improve the infrastructure for alternative fuels (electric vehicle charging, potentially hydrogen refuelling, etc.)
- encourage the transition of the fleet from internal combustion engines to zero-emission vehicles and / or sustainable fuels
- dramatically shift modal shares towards public transportation, rail, waterway transport, and multi-modal – this would need to happen within cities, in between cities, and across the TEN-T network – and would involve better rail connections, improved multi-modal transport, etc.

The costs of implementation of the top 20 Action groups identified for Kosovo are shown in the table below.

*Table KOS-8 Investment and other requirements according to type of source for top 20 Action groups for Kosovo (millions of EUR)*

RP	Central Budget (or entity level)	Municipal / regional budgets	Publicly owned companies	Private sector	Donor support - TA	Donor support - Loans/ Grants	Other	Total
Kosovo	€567.35	€23.32	€85.36	€1,511.62	€2.35	€843.43	€3,106.44	€6,139.87

The total costs for implementing all 67 Actions are presented in the table below along with an estimate as to the source of financing. These amounts mostly reflect amounts to be mobilised by the year 2030 – though some of the Actions also have significant investments expected afterwards. It can be noted that most of the budgets associated with implementation of the SSMS are included in the top 20 Action groups. This is because these are the Actions which generally involve the largest investments in infrastructure development and vehicle replacement.



Table KOS-9 Investment and other requirements according to type of source for all 67 Actions (millions of EUR)

RP	Central Budget (or entity level)	Municipal / regional budgets	Publicly owned companies	Private sector	Donor support - TA	Donor support - Loans/ Grants	Other	Total
Kosovo	€584.59	€23.39	€85.99	€1,512.36	€9.60	€875.65	€3,106.44	€6,198.01

In carrying out the Actions of the Strategy and achieving the targets of the Strategy at the RP level, the GHG emissions from the transport sector in Kosovo are projected to still increase due to the high grid emissions factor for electricity – from an estimated 0.7 million tCO<sub>2</sub>eq in the system analysed to 1.4 million tCO<sub>2</sub>eq in 2050.

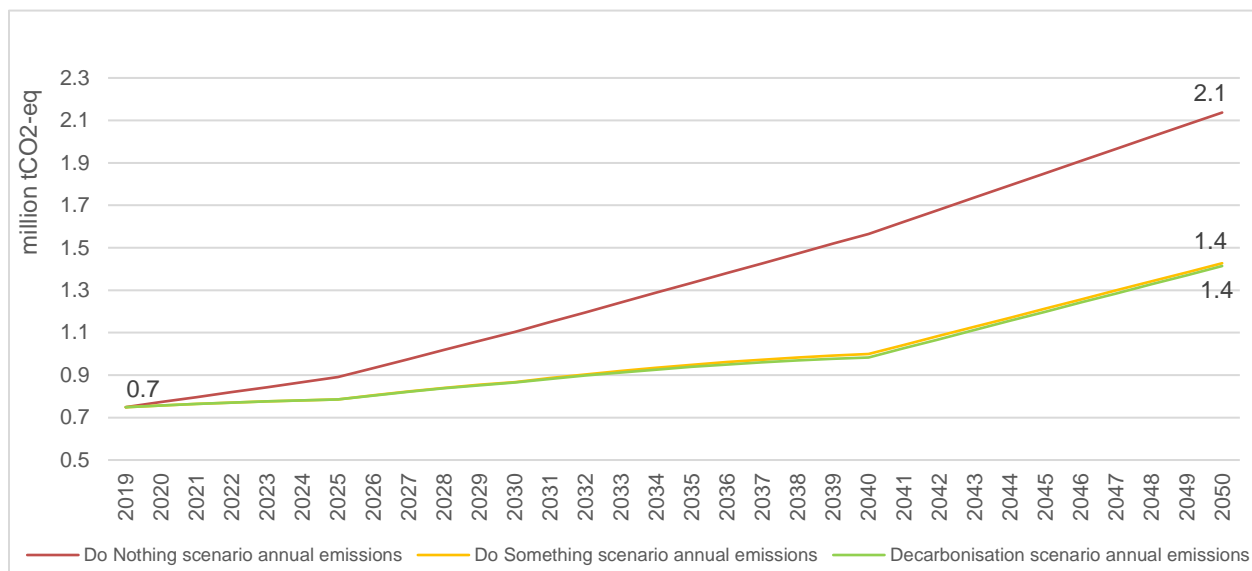
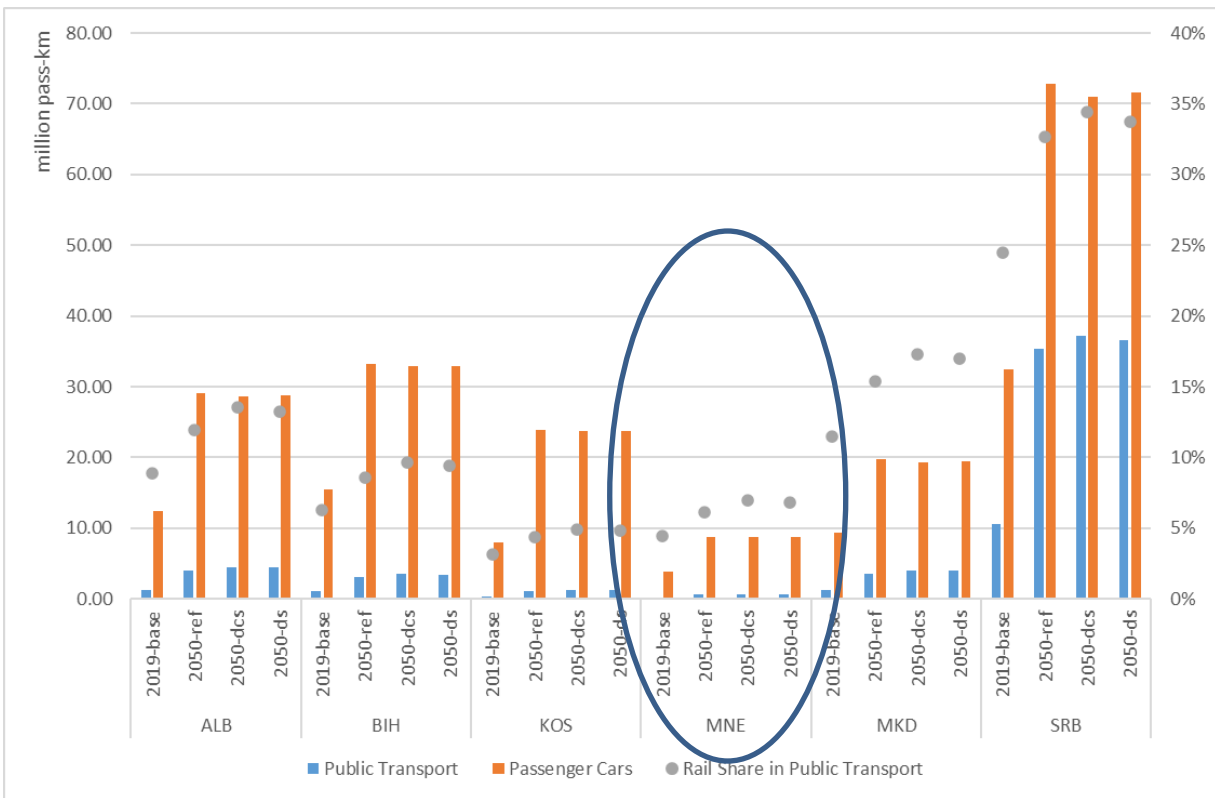


Figure KOS-9 Kosovo CO<sub>2</sub> emissions estimations for the different scenarios between 2019 – 2050 (million tonnes CO<sub>2</sub>-eq per year)

In switching fuels towards electricity and away from petroleum products, as well as increasing the efficiency of the transport system in general, the projected savings in fuel costs would be EUR 465 million in 2050 and over EUR 6.3 billion in cumulative savings through 2050.

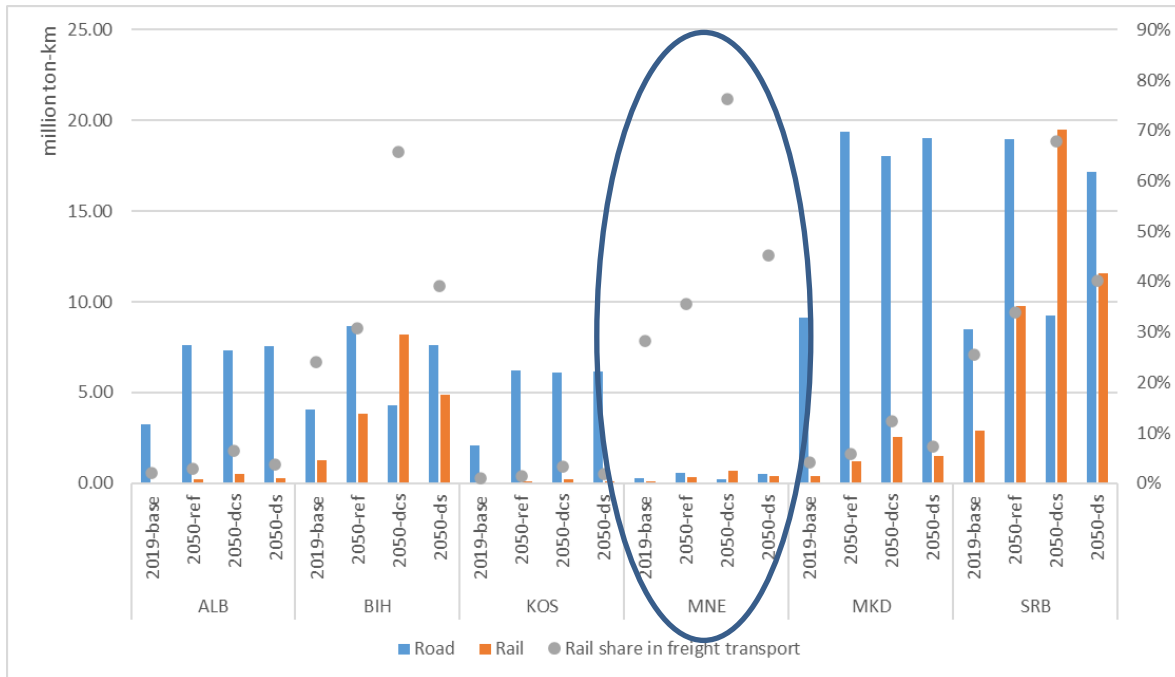
## Montenegro

Montenegro's transport sector is – as common in all the RPs - characterized by road-dominated transport with insufficient multi-modal and railway linkages. The breakdown of the estimated passenger-km and tonne-km in the base year (2019) and projections to 2050 are included in the two figures below. It can be noticed that the total amount of passenger-km are expected to more than double in the coming decades - which would put more stress on the transport system and result in increased energy consumption and associated GHGs if significant Actions are not taken.



\* base = Base year, ref = Reference scenario / Do Nothing scenario, ds = Do Something scenario, dcs = Decarbonisation scenario

Figure MNE-10 Passenger traffic and mode share on the level of RP in the Base year (2019) - Do Nothing, Do Something, and Decarbonisation scenarios (in million passenger-kilometres per year)



\* base = Base year, ref = Reference scenario / Do Nothing scenario, ds = Do Something scenario, dcs = Decarbonisation scenario

Figure MNE-11 Freight traffic and mode share on the level of RP – Do Nothing, Do Something, and Decarbonisation scenarios (in million tonne-kilometres per year)

Montenegro has a fairly coal-centred mix in electricity production – wherein the grid emissions factor is approximately 0.47 tCO<sub>2</sub>eq per MWh – which is almost double that of the average EU. This means that shifting to electric vehicles would only somewhat decrease the associated GHG emissions. The main challenge for decarbonisation of the sector will also therefore include decarbonisation of the energy sector – in addition to responding to the increasing demand that EVs will have in the near future using clean energy sources. Additional production would need to come on line to accommodate increased demand. The table below outlines the estimated share of electric vehicles in the decarbonization scenario according to type of transport.

Table MNE-10 Electrification level in road transport for the decarbonisation scenario per type of transport in Montenegro

Car				Bus				LCV				HCV			
2019	2030	2040	2050	2019	2030	2040	2050	2019	2030	2040	2050	2019	2030	2040	2050
0%	10%	60%	90%	0%	5%	50%	90%	0%	5%	50%	90%	0%	5%	50%	90%

According to the scoring carried out, the following 20 Action groups can be considered a priority for Montenegro.

Ranking	Action Group	Associated overall budget (EUR)	Notes
1	1.1. Transposition of alternative fuel directive 1.2. Deployment of e charging stations on the busiest corridors	506,763,435	Mostly private financing sources
2	4.1. Improving multimodality through transposition of intermodal/multimodal legislative framework	70,000	Mostly a technical assistance activity
3	1.4. Aligning the emission standards across the region, by setting the minimum standard for new cars at EURO6 1.6. Improve emission testing in roadworthiness checks	462,060,000	Government resources for the framework, linked to procurement and significant private investment
4	4.6. Rail Corridor Initiative – Western Balkans to join the Rail Freight Corridors	300,000	Mostly a technical assistance activity
5	4.2. Assessment of bottlenecks in modal interconnections and the current incentive system in place 4.3. Ensuring road/rail connections to TEN-T ports/ airports, freight terminals , and removing bottlenecks for intermodal transport 4.4. Construction of intermodal terminals and purchase of related equipment	1,365,900,000	Likely significant public investment / donor / lending contributions needed
6	3.1. Encourage regional capitals and assist in defining sustainable urban mobility solutions for the major urban nodes along the core network (last mile solutions)	111,230,000	Involves several activities as defined by Green City Action Plan / Sustainable Urban Mobility Plan
7	3.2. Introduction of regionally aligned Public Service Obligation for international passenger rail transport	660,000	Mostly a technical assistance activity – but linked to significant investments
8	3.3. Better manage and coordinate international rail traffic, including if necessary, through revised rules for capacity allocation and infrastructure charging in rail	980,000	Mostly a technical assistance activity
9	6.7. Deployment of Mobility as a Service (pax and freight) applications and digital transport corridors, smart mobility solutions and multimodal travel information services	2,000,000	Technical assistance and government resources for procurement – linked to eventual investment
10	2.2. Setting the foundation for deployment of alternative fuels infrastructure through transposition of relevant EU acquis in the air and waterborne sectors	150,000	Technical assistance and government resources– linked to eventual investment
11	3.4. Transposition of the Provisions of the Fourth Railway Package.	150,000	Mostly a technical assistance/ policy activity
12	1.5. Encouraging the introduction of incentives for zero-emission vehicles	1,070,291,776	Mostly private sources (vehicle buyers) but some public subsidies
13	6.9. Enable environment for multimodal ticketing in passenger transport and transpose relevant legislation.	200,000	Mostly a technical assistance/ policy activity
14	6.4. Deployment of ITS through transposition of EU directives, standards, preparation of project documentation and deployment	11,000,000	Mostly a technical assistance/ policy activity – linked to significant investments
15	8.12. Open Public Funds for Railway Fleet Renewal for Passenger and Freight transport	141,600,000	Mix of public funds, donor / lending, and companies
16	1.3. Undertake feasibility study on the use of hydrogen on trucks along the busiest corridors	1,942,464	Initial TA linked to a mix of public funds, donor /

Ranking	Action Group	Associated overall budget (EUR)	Notes
17	6.8. Initiating deployment of 5G transport corridors across region on Core and Comprehensive Network	166,666,667	lending, and companies investments Mostly private investments (companies)
18	8.9. Reforming the railway sector through transposition and implementation of Market opening, passenger rights, interoperability, border crossings/ common crossings legislation	140,000	Mostly a technical assistance/ policy activity
19	5.2. Adopt and implement guidelines for operators and platforms to inform passengers about the carbon footprint of their trip and to enable passengers to voluntarily offset it, and for wider use of eco-routing for (in-built) navigation software	150,000	Mostly a technical assistance activity
20	8.7. Electrification of the rail core network and implementation of Flagship 1, 2, 3	912,442,396	Mix of public funds, donor / lending, and companies

The key Actions which combine to have a huge impact on the projected greenhouse gas emissions and energy consumption of the transport system in Montenegro include the following key directions:

- improve the infrastructure for alternative fuels (electric vehicle charging, potentially hydrogen refuelling, etc.)
- encourage the transition of the fleet from internal combustion engines to zero-emission vehicles and / or sustainable fuels
- dramatically shift modal shares towards public transportation, rail, waterway transport, and multi-modal – this would need to happen within cities, in between cities, and across the TEN-T network – and would involve better rail connections, improved multi-modal transport, etc.

The costs of implementation of the top 20 Action groups identified for Montenegro are shown in the table below.

*Table MNE-11 Investment and other requirements according to type of source for top 20 Action groups for Montenegro (millions of EUR)*

RP	Central Budget (or entity level)	Municipal / regional budgets	Publicly owned companies	Private sector	Donor support - TA	Donor support - Loans/ Grants	Other	Total
Montenegro	€1,089.69	€6.97	€44.97	€770.57	€2.76	€1,321.66	€1,529.48	€4,766.10

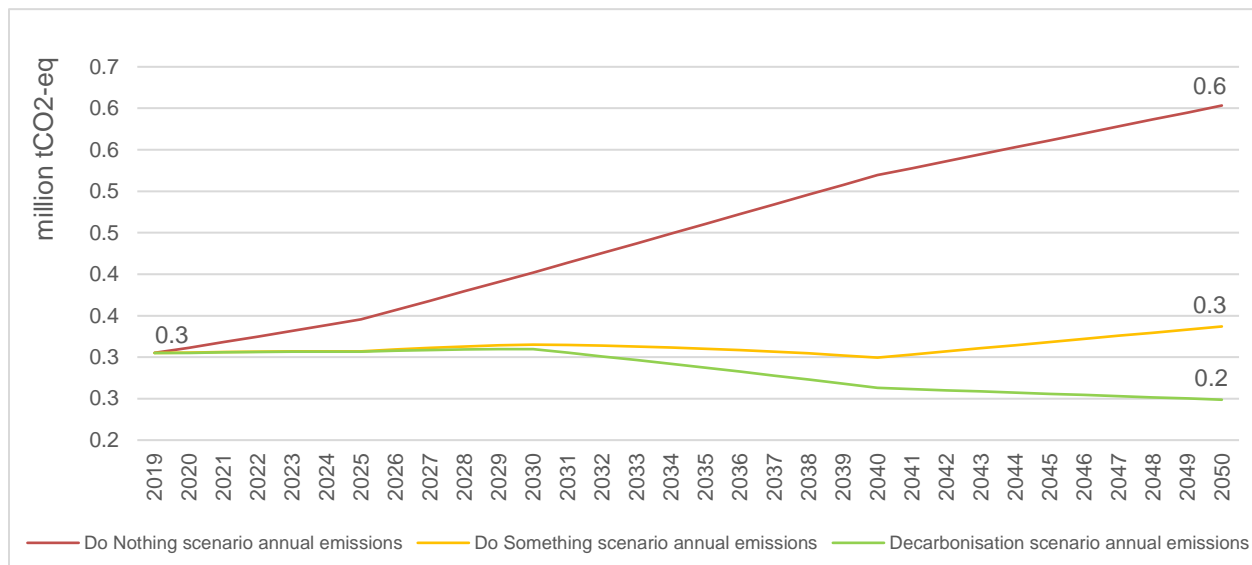
The total costs for implementing all 67 Actions are presented in the table below along with an estimate as to the source of financing. These amounts mostly reflect amounts to be mobilised by the year 2030 – though some of the Actions also have significant investments expected afterwards. It can be noted that most of the budgets associated with implementation of the SSMS are included in the top 20 Action groups. This is because these are the Actions which generally involve the largest investments in infrastructure development and vehicle replacement.

Table MNE-12 Investment and other requirements according to type of source for all 67 Actions (millions of EUR)

RP	Central Budget (or entity level)	Municipal / regional budgets	Publicly owned companies	Private sector	Donor support - TA	Donor support - Loans/ Grants	Other	Total
Montenegro	€1,101.28	€7.24	€47.40	€775.50	€9.99	€1,339.34	€1,529.48	€4,810.24

In carrying out the Actions of the Strategy and achieving the targets of the Strategy at the RP level, the GHG emissions from the transport sector in Montenegro are projected to decrease – though only slightly due to the relatively high grid emissions factor for electricity – from an estimated 0.3 million tCO<sub>2</sub>eq in the system analysed to 0.2 million tCO<sub>2</sub>eq in 2050.

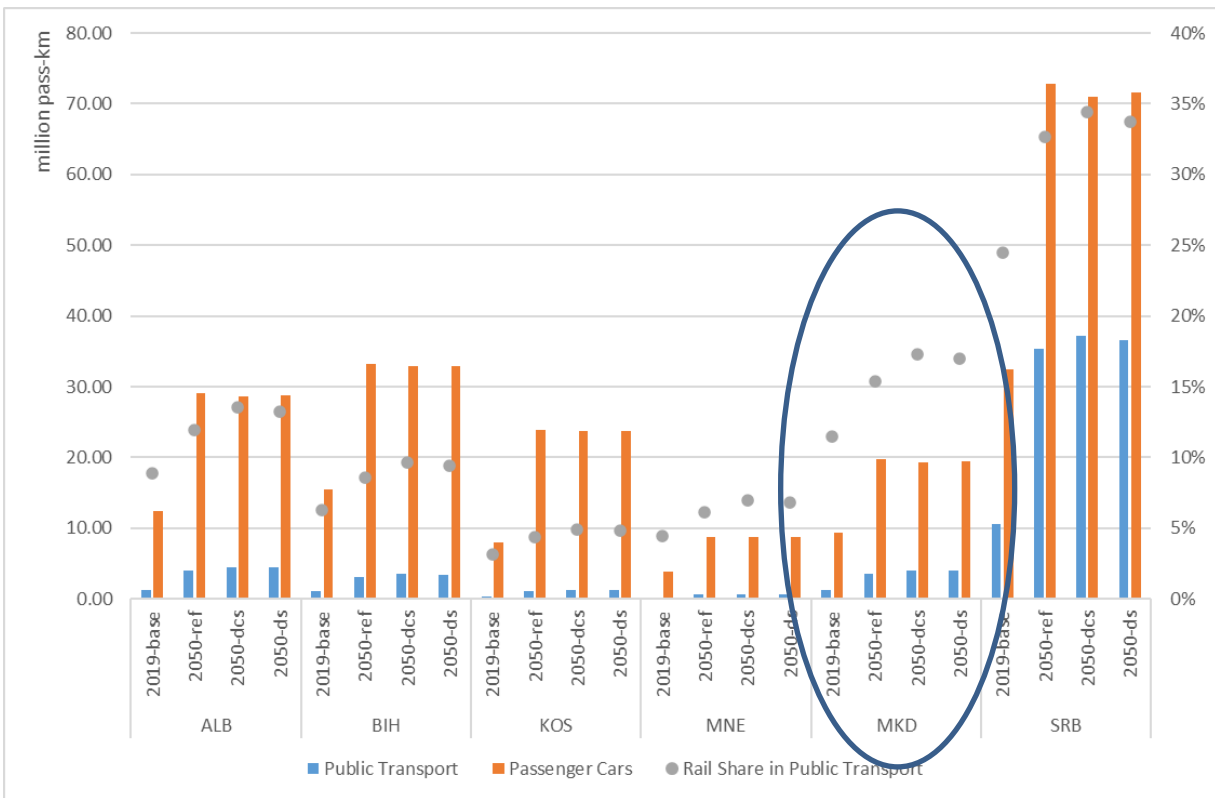
Figure MNE-12 – Montenegro CO<sub>2</sub> emissions estimations for the different scenarios between 2019 – 2050 (million tonnes CO<sub>2</sub>-eq per year)



In switching fuels towards electricity and away from petroleum products, as well as increasing the efficiency of the transport system in general, the projected savings in fuel costs would be EUR 261 million in 2050 and over EUR 3.86 billion in cumulative savings through 2050.

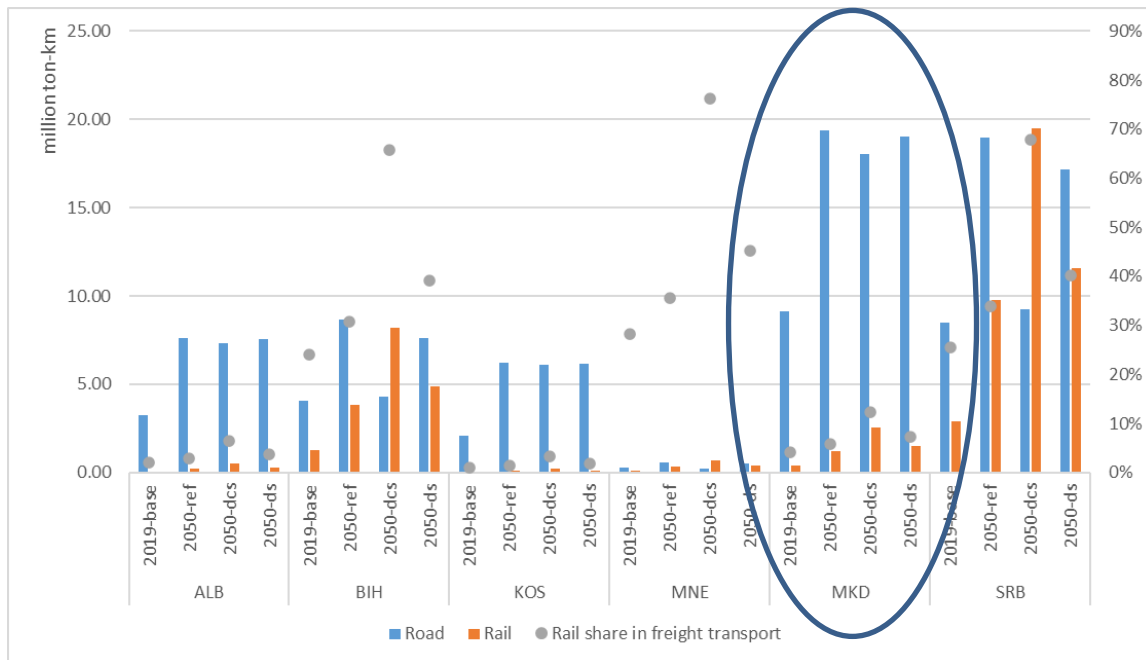
## North Macedonia

North Macedonia's transport sector is – as common in all the RPs - characterized by road-dominated transport with insufficient multi-modal and railway linkages. The breakdown of the estimated passenger-km and tonne-km in the base year (2019) and projections to 2050 are included in the two figures below. It can be noticed that the total amount of passenger-km are expected to more than double in the coming decades - which would put more stress on the transport system and result in increased energy consumption and associated GHGs if significant Actions are not taken.



\* base = Base year, ref = Reference scenario / Do Nothing scenario, ds = Do Something scenario, dcs = Decarbonisation scenario

Figure MKD-13 Passenger traffic and mode share on the level of RP in the Base year (2019) - Do Nothing, Do Something, and Decarbonisation scenarios (in million passenger-kilometres per year)



\* base = Base year, ref = Reference scenario / Do Nothing scenario, ds = Do Something scenario, dcs = Decarbonisation scenario

Figure MKD-14 Freight traffic and mode share on the level of RP – Do Nothing, Do Something, and Decarbonisation scenarios (in million tonne-kilometres per year)

North Macedonia has a fairly coal-centred mix in electricity production – wherein the grid emissions factor is approximately 0.563 tCO<sub>2</sub>eq per MWh – which is more than double that of the average EU. This means that shifting to electric vehicles would only somewhat decrease the associated GHG emissions. The main challenge for decarbonisation of the sector will also therefore include decarbonisation of the energy sector – in addition to responding to the increasing demand that EVs will have in the near future using clean energy sources. Additional production would need to come on line to accommodate increased demand. The table below outlines the estimated share of electric vehicles in the decarbonization scenario according to type of transport.

Table MKD-13 Electrification level in road transport for the decarbonisation scenario per type of transport in North Macedonia

Car				Bus				LCV				HCV			
2019	2030	2040	2050	2019	2030	2040	2050	2019	2030	2040	2050	2019	2030	2040	2050
0%	10%	60%	90%	0%	5%	50%	90%	0%	5%	50%	90%	0%	5%	50%	90%

According to the scoring carried out, the following 20 Action groups can be considered a priority for North Macedonia.



Ranking	Action Group	Associated overall budget (EUR)	Notes
1	1.1. Transposition of alternative fuel directive 1.2. Deployment of e charging stations on the busiest corridors	1,406,504,307	Mostly private financing sources
2	4.1. Improving multimodality through transposition of intermodal/multimodal legislative framework	70,000	Mostly a technical assistance activity
3	1.4. Aligning the emission standards across the region, by setting the minimum standard for new cars at EURO6 1.6. Improve emission testing in roadworthiness checks	69,420,000	Government resources for the framework, linked to procurement and significant private investment
4	4.6. Rail Corridor Initiative – Western Balkans to join the Rail Freight Corridors	300,000	Mostly a technical assistance activity
5	4.2. Assessment of bottlenecks in modal interconnections and the current incentive system in place 4.3. Ensuring road/rail connections to TEN-T ports/ airports, freight terminals , and removing bottlenecks for intermodal transport 4.4. Construction of intermodal terminals and purchase of related equipment	811,700,000	Likely significant public investment / donor / lending contributions needed
6	3.1. Encourage regional capitals and assist in defining sustainable urban mobility solutions for the major urban nodes along the core network (last mile solutions)	446,150,000	Involves several activities as defined by Green City Action Plan / Sustainable Urban Mobility Plan
7	3.2. Introduction of regionally aligned Public Service Obligation for international passenger rail transport	660,000	Mostly a technical assistance activity – but linked to significant investments
8	3.3. Better manage and coordinate international rail traffic, including if necessary, through revised rules for capacity allocation and infrastructure charging in rail	980,000	Mostly a technical assistance activity
9	6.7. Deployment of Mobility as a Service (pax and freight) applications and digital transport corridors, smart mobility solutions and multimodal travel information services	2,000,000	Technical assistance and government resources for procurement – linked to eventual investment
10	3.4. Transposition of the Provisions of the Fourth Railway Package	150,000	Mostly a technical assistance/ policy activity
11	1.5. Encouraging the introduction of incentives for zero-emission vehicles	2,835,693,027	Mostly private sources (vehicle buyers) but some public subsidies
12	6.9. Enable environment for multimodal ticketing in passenger transport and transpose relevant legislation.	200,000	Mostly a technical assistance/ policy activity
13	6.3. Initiation of deployment of ERTMS through transposition of EU directives, TSIs, preparation of project documentation and deployment	200,000	Mostly a technical assistance/ policy activity
14	6.4. Deployment of ITS through transposition of EU directives, standards, preparation of project documentation and deployment	10,000,000	Mostly a technical assistance/ policy activity – linked to significant investments
15	8.12. Open Public Funds for Railway Fleet Renewal for Passenger and Freight transport	212,400,000	Mix of public funds, donor / lending, and companies
16	1.3. Undertake feasibility study on the use of hydrogen on trucks along the busiest corridors	62,962,174	Initial TA linked to a mix of public funds, donor / lending, and companies

Ranking	Action Group	Associated overall budget (EUR)	Notes
17	6.8. Initiating deployment of 5G transport corridors across region on Core and Comprehensive Network	166,666,667	Mostly private investments (companies)
18	8.9. Reforming the railway sector through transposition and implementation of Market opening, passenger rights, interoperability, border crossings/ common crossings legislation	140,000	Mostly a technical assistance/ policy activity
19	5.2. Adopt and implement guidelines for operators and platforms to inform passengers about the carbon footprint of their trip and to enable passengers to voluntarily offset it, and for wider use of eco-routing for (in-built) navigation software	150,000	To be covered under existing processes
20	8.7. Electrification of the rail core network and implementation of Flagship 1, 2, 3	635,944,700	Mix of public funds, donor / lending, and companies

The key Actions which combine to have a huge impact on the projected greenhouse gas emissions and energy consumption of the transport system in North Macedonia include the following key directions:

- improve the infrastructure for alternative fuels (electric vehicle charging, potentially hydrogen refuelling, etc.)
- encourage the transition of the fleet from internal combustion engines to zero-emission vehicles and / or sustainable fuels
- dramatically shift modal shares towards public transportation, rail, waterway transport, and multi-modal – this would need to happen within cities, in between cities, and across the TEN-T network – and would involve better rail connections, improved multi-modal transport, etc.

The costs of implementation of the top 10 Actions identified for North Macedonia are shown in the table below.

*Table MKD-14 Investment and other requirements according to type of source for top 10 Actions for Albania (millions of EUR)*

RP	Central Budget (or entity level)	Municipal / regional budgets	Publicly owned companies	Private sector	Donor support - TA	Donor support - Loans/ Grants	Other	Total
North Macedonia	€778.88	€27.07	€92.16	€1,965.01	€2.49	€898.27	€2,898.40	€6,662.29

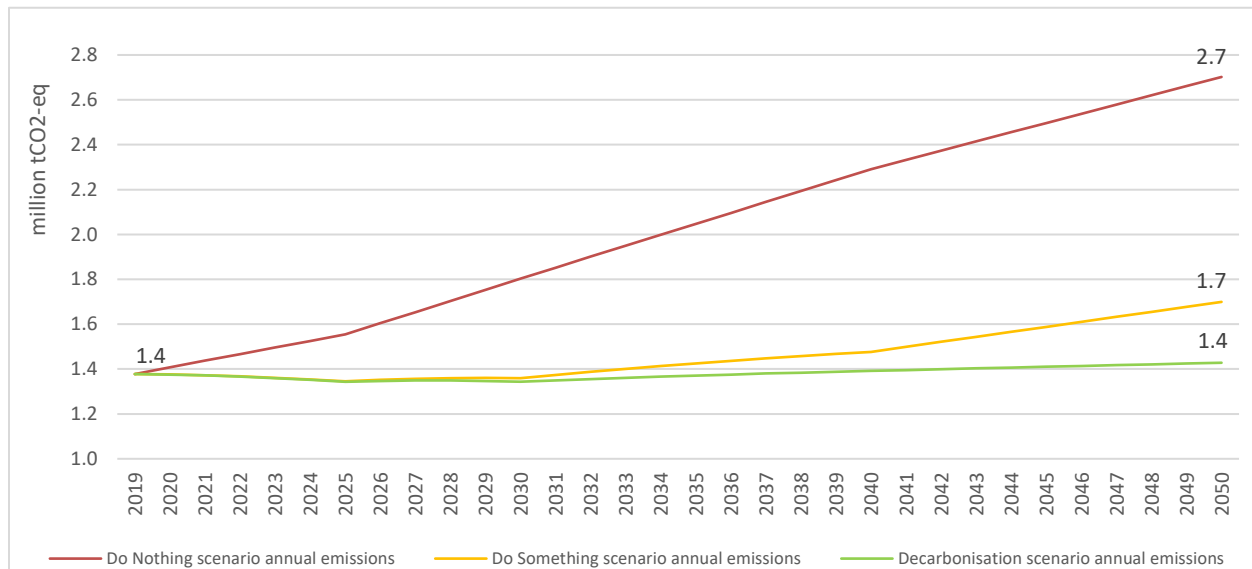
The total costs for implementing all 67 Actions are presented in the table below along with an estimate as to the source of financing. These amounts mostly reflect amounts to be mobilised by the year 2030 – though some of the Actions also have significant investments expected afterwards. It can be noted that most of the budgets associated with implementation of the SSMS are included in the top 20 Action groups. This is because these are the Actions which generally involve the largest investments in infrastructure development and vehicle replacement.

*Table MKD-15 Investment and other requirements according to type of source for all 67 Actions (millions of EUR)*

RP	Central Budget (or entity level)	Municipal / regional budgets	Publicly owned companies	Private sector	Donor support - TA	Donor support - Loans/ Grants	Other	Total
North Macedonia	€796.28	€27.14	€92.75	€1,965.75	€9.26	€931.03	€2,898.40	€6,720.61

In carrying out the Actions of the Strategy and achieving the targets of the Strategy at the RP level, the GHG emissions from the transport sector in North Macedonia are projected to be approximately the same – due to the relatively high grid emissions factor for electricity – staying at approximately 1.4 million tCO<sub>2</sub>eq through 2050.

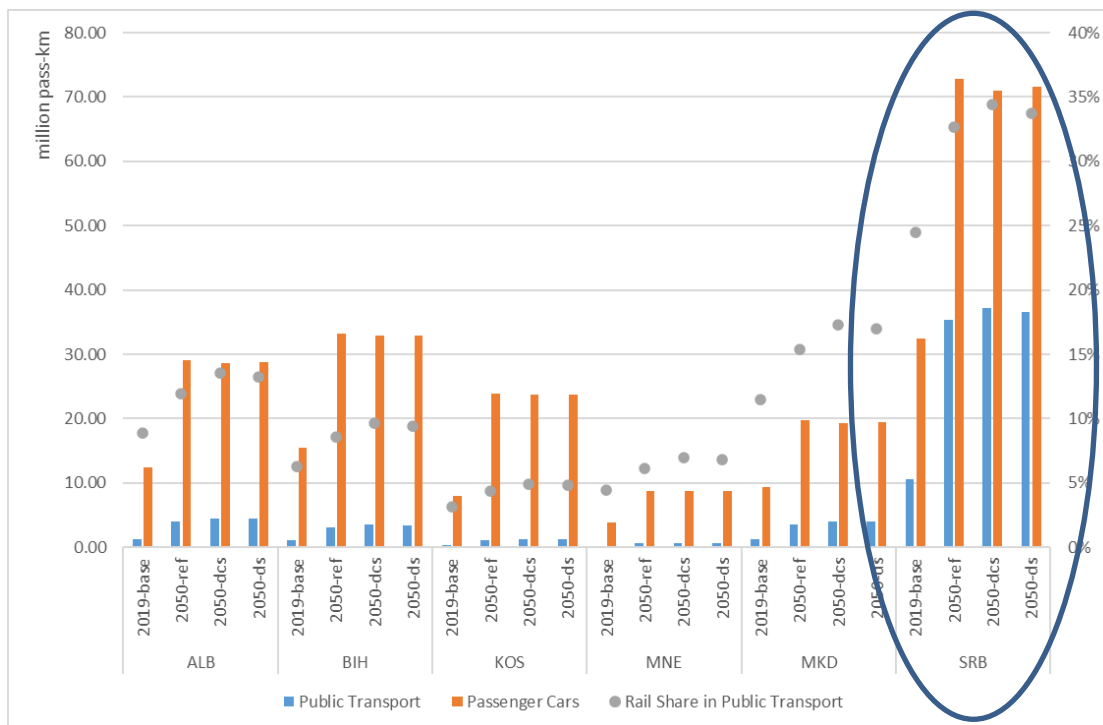
*Figure MKD-15 – North Macedonia CO<sub>2</sub> emissions estimations for the different scenarios between 2019 – 2050 (million tonnes CO<sub>2</sub>-eq per year)*



In switching fuels towards electricity and away from petroleum products, as well as increasing the efficiency of the transport system in general, the projected savings in fuel costs would be EUR 1.1 billion in 2050 and over EUR 15.3 billion in cumulative savings through 2050.

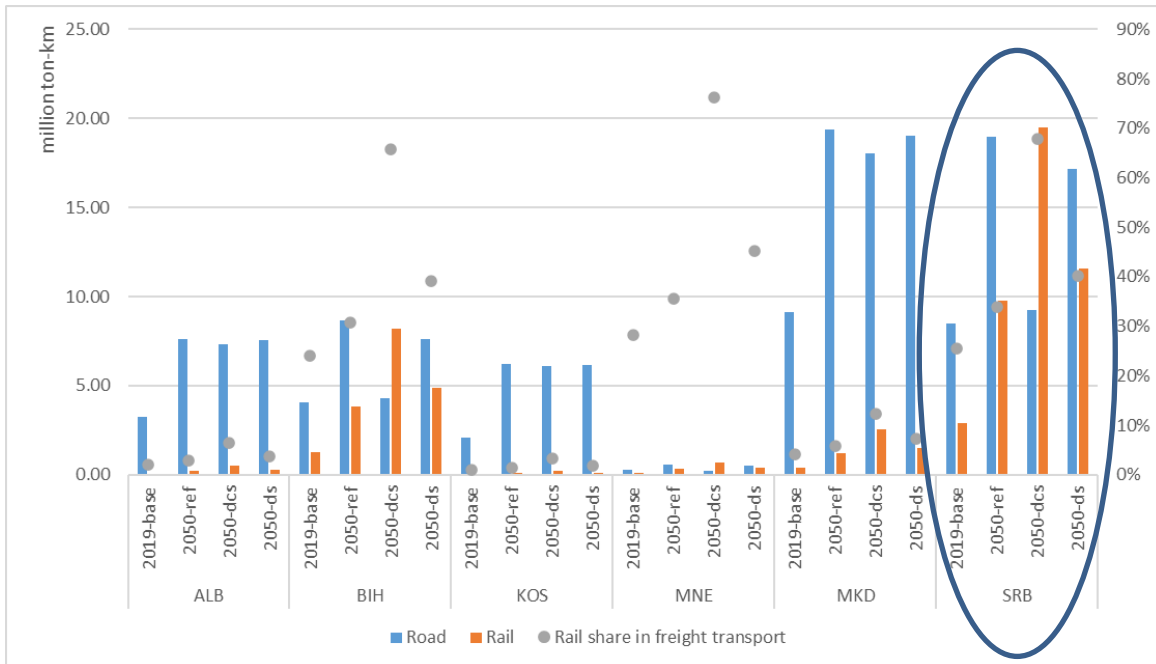
## Serbia

Serbia's transport sector is – as common in all the RPs - characterized by road-dominated transport with insufficient multi-modal and railway linkages. The breakdown of the estimated passenger-km and tonne-km in the base year (2019) and projections to 2050 are included in the two figures below. It can be noticed that the total amount of passenger-km are expected to more than double in the coming decades - which would put more stress on the transport system and result in increased energy consumption and associated GHGs if significant Actions are not taken.



\* base = Base year, ref = Reference scenario / Do Nothing scenario, ds = Do Something scenario, dcs = Decarbonisation scenario

Figure SRB-16 Passenger traffic and mode share on the level of RP in the Base year (2019) - Do Nothing, Do Something, and Decarbonisation scenarios (in million passenger-kilometres per year)



\* base = Base year, ref = Reference scenario / Do Nothing scenario, ds = Do Something scenario, dcs = Decarbonisation scenario

Figure SRB-17 Freight traffic and mode share on the level of RP – Do Nothing, Do Something, and Decarbonisation scenarios (in million tonne-kilometres per year)

Serbia has a fairly coal-centred mix in electricity production – wherein the grid emissions factor is approximately 0.68 tCO<sub>2</sub>e per MWh – which is more than double that of the average EU. This means that shifting to electric vehicles would only somewhat decrease the associated GHG emissions. The main challenge for decarbonisation of the sector will also therefore include decarbonisation of the energy sector – in addition to responding to the increasing demand that EVs will have in the near future using clean energy sources. Additional production would need to come on line to accommodate increased demand. The table below outlines the estimated share of electric vehicles in the decarbonization scenario according to type of transport.

Table SRB-16 Electrification level in road transport for the decarbonisation scenario per type of transport in Serbia

Car				Bus				LCV				HCV			
2019	2030	2040	2050	2019	2030	2040	2050	2019	2030	2040	2050	2019	2030	2040	2050
0%	10%	60%	90%	0%	5%	50%	90%	0%	5%	50%	90%	0%	5%	50%	90%

According to the scoring carried out, the following 20 Action groups can be considered a priority for Serbia.

Ranking	Action Group	Associated overall budget (EUR)	Notes
1	1.1. Transposition of alternative fuel directive 1.2. Deployment of e charging stations on the busiest corridors	5,168,990,267	Mostly private financing sources
2	4.1. Improving multimodality through transposition of intermodal/multimodal legislative framework	70,000	Mostly a technical assistance activity
3	1.4. Aligning the emission standards across the region, by setting the minimum standard for new cars at EURO6 1.6. Improve emission testing in roadworthiness checks	11,558,305,964	Government resources for the framework, linked to procurement and significant private investment
4	4.6. Rail Corridor Initiative – Western Balkans to join the Rail Freight Corridors	300,000	Mostly a technical assistance activity
5	4.2. Assessment of bottlenecks in modal interconnections and the current incentive system in place 4.3. Ensuring road/rail connections to TEN-T ports/ airports, freight terminals , and removing bottlenecks for intermodal transport 4.4. Construction of intermodal terminals and purchase of related equipment	2,382,900,000	Likely significant public investment / donor / lending contributions needed
6	3.1. Encourage regional capitals and assist in defining sustainable urban mobility solutions for the major urban nodes along the core network (last mile solutions)	3,550,900,000	Involves several activities as defined by Green City Action Plan / Sustainable Urban Mobility Plan
7	8.10. Improving inland waterways through prioritisation of INLAND WATERWAYS projects and Implementation of economic investment plan Flagship 1 projects	367,050,000	Mostly a technical assistance activity – but linked to significant investments
8	3.2. Introduction of regionally aligned Public Service Obligation for international passenger rail transport	660,000	Mostly a technical assistance activity – but linked to significant investments
9	3.3. Better manage and coordinate international rail traffic, including if necessary, through revised rules for capacity allocation and infrastructure charging in rail	980,000	Mostly a technical assistance activity
10	6.7. Deployment of Mobility as a Service (pax and freight) applications and digital transport corridors, smart mobility solutions and multimodal travel information services	2,000,000	Technical assistance and government resources for procurement – linked to eventual investment
11	2.2. Setting the foundation for deployment of alternative fuels infrastructure through transposition of relevant EU acquis in the air and waterborne sectors	150,000	Technical assistance and government resources– linked to eventual investment
12	3.4. Transposition of the Provisions of the Fourth Railway Package.	150,000	Mostly a technical assistance/ policy activity
13	1.5. Encouraging the introduction of incentives for zero-emission vehicles	9,138,645,164	Mostly private sources (vehicle buyers) but some public subsidies
14	6.9. Enable environment for multimodal ticketing in passenger transport and transpose relevant legislation.	200,000	Mostly a technical assistance/ policy activity
15	6.4. Deployment of ITS through transposition of EU directives, standards, preparation of project documentation and deployment	26,000,000	Mostly a technical assistance/ policy activity – linked to significant investments

Ranking	Action Group	Associated overall budget (EUR)	Notes
16	8.12. Open Public Funds for Railway Fleet Renewal for Passenger and Freight transport	424,800,000	Mix of public funds, donor / lending, and companies
17	1.3. Undertake feasibility study on the use of hydrogen on trucks along the busiest corridors	60,645,814	Initial TA linked to a mix of public funds, donor / lending, and companies
18	6.8. Initiating deployment of 5G transport corridors across region on Core and Comprehensive Network	166,666,667	Mostly private investments (companies)
19	5.2. Adopt and implement guidelines for operators and platforms to inform passengers about the carbon footprint of their trip and to enable passengers to voluntarily offset it, and for wider use of eco-routing for (in-built) navigation software	150,000	Mostly a technical assistance activity
20	8.7. Electrification of the rail core network and implementation of Flagship 1, 2, 3	5,042,626,728	Mix of public funds, donor / lending, and companies

The key Actions which combine to have a huge impact on the projected greenhouse gas emissions and energy consumption of the transport system in Serbia include the following key directions:

- improve the infrastructure for alternative fuels (electric vehicle charging, potentially hydrogen refuelling, etc.)
- encourage the transition of the fleet from internal combustion engines to zero-emission vehicles and / or sustainable fuels
- dramatically shift modal shares towards public transportation, rail, waterway transport, and multi-modal – this would need to happen within cities, in between cities, and across the TEN-T network – and would involve better rail connections, improved multi-modal transport, etc.

The costs of implementation of the top 20 Action groups identified for Serbia are shown in the table below.

*Table SRB-17 Investment and other requirements according to type of source for top 20 Action groups for Serbia (millions of EUR)*

RP	Central Budget (or entity level)	Municipal / regional budgets	Publicly owned companies	Private sector	Donor support - TA	Donor support - Loans/ Grants	Other	Total
Serbia	€5,020.72	€213.35	€453.08	€8,053.98	€3.26	€3,471.39	€11,538.21	€28,753.99

The total costs for implementing all 67 Actions are presented in the table below along with an estimate as to the source of financing. These amounts mostly reflect amounts to be mobilised by the year 2030 – though some of the Actions also have significant investments expected afterwards. It can be noted that most of the budgets associated with implementation of the SSMS are included in the top 20 Action groups. This is because these are the Actions which generally involve the largest investments in infrastructure development and vehicle replacement.

Table SRB-18 Investment and other requirements according to type of source for all 67 Actions (millions of EUR)

RP	Central Budget (or entity level)	Municipal / regional budgets	Publicly owned companies	Private sector	Donor support - TA	Donor support - Loans/ Grants	Other	Total
Serbia	€5,072.37	€213.42	€454.64	€8,056.06	€9.85	€3,584.91	€11,538.21	€28,929.47

In carrying out the Actions of the Strategy and achieving the targets of the Strategy at the RP level, the GHG emissions from the transport sector in Serbia are projected to decrease but only slightly – due to the relatively high grid emissions factor for electricity – reducing from 3.3 million tCO<sub>2</sub>eq in 2019 to 2.5 million tCO<sub>2</sub>eq in 2050. It should be noted that the grid emissions factor used for Serbia in the calculations was 0.678 tCO<sub>2</sub>eq/MWh based on the UNFCCC, Harmonised Grid emission factor data set<sup>21</sup>. However, the current estimate for the grid emissions factor for Serbia for the major producer of electricity (EPS) is over 1.0 tCO<sub>2</sub>eq/MWh produced – though this does not account for electricity from independent renewable energy producers. If new production of electricity has the same level of emissions as EPS (being coal-based), then electrification of the vehicle fleet will not likely lead to any greenhouse gas emissions savings and could potentially lead to their increase.

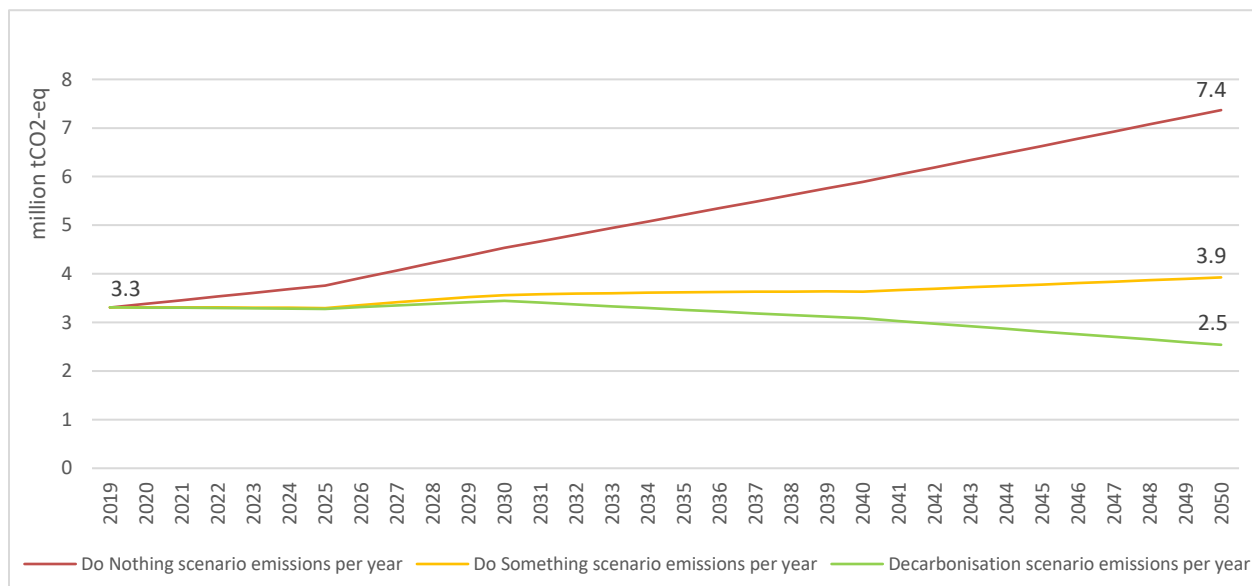


Figure SRB-18– Serbia CO<sub>2</sub> emissions estimations for the different scenarios between 2019– 2050 (million tonnes CO<sub>2</sub>-eq per year)

In switching fuels towards electricity and away from petroleum products, as well as increasing the efficiency of the transport system in general, the projected savings in fuel costs would be EUR 2.9 billion in 2050 and over EUR 40.8 billion in cumulative savings through 2050.

<sup>21</sup> [https://unfccc.int/sites/default/files/resource/Harmonized\\_Grid\\_Emission\\_factor\\_data\\_set.xlsx](https://unfccc.int/sites/default/files/resource/Harmonized_Grid_Emission_factor_data_set.xlsx)



## Annex No.2 Prioritisation of Action groups in the RPs

The following tables show the prioritisation of Action groups in the 6 RPs. Note that some of the actions have been organised together in groups where they are logically and integrally linked together.

### Albania

No	Actions	Ranking total
1.1 1.2	1.1. Transposition of alternative fuel directive 1.2. Deployment of e charging stations on the busiest corridors	1
4.1	4.1. Improving multimodality through transposition of intermodal/multimodal legislative framework	2
1.4 1.6	1.4. Aligning the emission standards across the region, by setting the minimum standard for new cars at EURO6 1.6. Improve emission testing in roadworthiness checks	3
4.6	4.6. Rail Corridor Initiative – Western Balkans to join the Rail Freight Corridors	4
4.2 4.3 4.4	4.2. Assessment of bottlenecks in modal interconnections and the current incentive system in place 4.3. Ensuring road/rail connections to TEN-T ports/ airports, freight terminals , and removing bottlenecks for intermodal transport 4.4. Construction of intermodal terminals and purchase of related equipment	5
3.1	3.1. Encourage regional capitals and assist in defining sustainable urban mobility solutions for the major urban nodes along the core network (last mile solutions)	6
3.2	3.2. Introduction of regionally aligned Public Service Obligation for international passenger rail transport	7
3.3	3.3. Better manage and coordinate international rail traffic, including if necessary, through revised rules for capacity allocation and infrastructure charging in rail	8
6.7	6.7. Deployment of Mobility as a Service (pax and freight) applications and digital transport corridors, smart mobility solutions and multimodal travel information services	9
2.2	2.2. Setting the foundation for deployment of alternative fuels infrastructure through transposition of relevant EU acquis in the air and waterborne sectors	10
3.4	3.4. Transposition of the Provisions of the Fourth Railway Package	11
6.1	6.1. Enable B2A multimodal data exchange through implementation of the e-FTI Regulation and Maritime Single Window environment	12

<b>1.5</b>	1.5. Encouraging the introduction of incentives for zero-emission vehicles	13
<b>6.9</b>	6.9. Enable environment for multimodal ticketing in passenger transport and transpose relevant legislation.	14
<b>6.3</b>	6.3. Initiation of deployment of ERTMS through transposition of EU directives, TSIs, preparation of project documentation and deployment	15
<b>6.8</b>	6.8. Initiating deployment of 5G transport corridors across region on Core and Comprehensive Network	16
<b>8.9</b>	8.9. Reforming the railway sector through transposition and implementation of Market opening, passenger rights, interoperability, border crossings/ common crossings legislation	17
<b>5.2</b>	5.2. Adopt and implement guidelines for operators and platforms to inform passengers about the carbon footprint of their trip and to enable passengers to voluntarily offset it, and for wider use of eco-routing for (in-built) navigation software	18
<b>8.12</b>	8.12. Open Public Funds for Railway Fleet Renewal for Passenger and Freight transport	19
<b>8.7</b>	8.7. Electrification of the rail core network and implementation of Flagship 1, 2, 3	20
<b>1.3</b>	1.3. Undertake feasibility study on the use of hydrogen on trucks along the busiest corridors	21
<b>8.4</b> <b>8.5</b>	8.4. Adopt guidelines to assess climate change and natural hazards of road network 8.5. Developing and implementing climate resilience plans for RPs transport networks	22
<b>6.5</b>	6.5. Initiation of deployment of VTMS and e maritime services through transposition of EU directives, standards, preparation of project documentation and deployment	23
<b>8.6</b>	8.6. Establishing efficient road maintenance through multiannual road maintenance plans and Road Asset Management Systems	24
<b>2.1</b>	2.1. Follow up on deliverables of INTERREG projects regarding Action Plans for Greening of the Ports of Bar and Durres	25
<b>6.3</b>	6.3. Initiation of deployment of ERTMS through transposition of EU directives, TSIs, preparation of project documentation and deployment	26
<b>5.3</b>	5.3. Deployment of e-tolling and achieving interoperability of electronic road toll systems and facilitating cross-border exchange of information	27
<b>8.1</b> <b>8.2</b>	8.1. Revisiting national transport strategies and prioritising green elements 8.2. Capacity building for administration on green and digital transformation of transport	28
<b>7.7</b>	7.7. Adopt the regulatory framework for drones and unmanned aircraft	29
<b>7.8</b> <b>7.9</b>	7.8. Adopt the EU type approval legislation to facilitate car data-based services including interaction with energy system 7.9. Adopt regulatory framework to open access to car data to mobility services	30

<b>8.8</b>	8.8. Improvement of road and rail border crossings / common crossings (removal of administrative bottlenecks, additional parking lanes, construction of joint BCPs/CCPs)	31
<b>10.1</b>	10.1. Improving road safety management, enabling safer infrastructure a better protection of road users	32
<b>7.5</b>	7.5. Establish national access point under ITS Directive and join European mobility data space	33
<b>7.6</b>	7.6. Adopt rules on a trusted environment for corridor data exchange to support collaborative logistics	34
<b>10.3 10.5 10.6</b>	10.3. Improve domestic legislation transposing transport of dangerous goods Acquis 10.5. Enforcement procedures for transport of dangerous goods to be put in place for rail, road and inland waterways 10.6. Enhance research on transport of dangerous goods	35
<b>7.1 7.2 7.3 7.4</b>	7.1. Develop R&I partnerships within the region and with EU bodies 7.2. Encourage public companies/institutions/universities to establish innovation centres 7.3. Improve coordination between public authorities, universities, NGOs on regional to encourage interdisciplinary research in green and digital mobility 7.4. Increase the awareness and educate young leaders, officials, and other relevant stakeholders on greening of transport	36
<b>6.2</b>	6.2. Use of modern software at border crossing points /common crossing points (such as e-qms, NCTS, SEED, NSW, Galileo app)	37
<b>7.10</b>	7.10. Undertake impact assessment and prepare roadmap for AI for mobility	38
<b>9.4</b>	9.4. Prepare a Blueprint to tackle the challenges that come with the digitalisation and modernisation of the transport sector (ageing workforce, staff shortage and skills mismatch).	39
<b>9.5</b>	9.5. Complete transposition and implementation of the relevant social policy legislation in the Transport Community Treaty	40
<b>9.6</b>	9.6. Review of the guidelines on the Land PSO Regulation and provide guidance on freight PSOs	41
<b>10.4</b>	10.4. Enhance mechanisms for market surveillance, cooperation on standardisation	42
<b>6.10</b>	6.10. Assess the needs for setting up agencies or other bodies to support safe, smart and sustainable road transport operations	43
<b>9.1 9.2 9.3</b>	9.1. Setting up a Platform for Change and removal of legal barriers to women's economic empowerment 9.2. Play an active role to assist regional institutions in removal of legal barriers to women's economic empowerment opportunities 9.3. Encourage IFIs, Ministries in charge of transport and Transport Departments within the Universities across the region to develop grant schemes for women internships in transport sector	44
<b>10.2</b>	10.2. Prepare and adopt Road Safety National Strategy and set road safety targets for the next decade 2021-2030	45

<b>8.3</b>	8.3. Development of cost effectiveness analysis of the Sustainable and Smart Mobility Strategy Western Balkans Perspective and elaboration of detailed action plans per each Regional Party	46
<b>5.1</b>	5.1. Establish EU framework for harmonised measurement of transport and logistics emissions	47
<b>5.4</b>	5.4. Establish Transport Community Transport Observatory Database and Information System (TODIS)	48
<b>6.11</b>	6.11. Transpose the EU legal framework on the approval of connected and automated vehicles	49
<b>8.11</b>	8.11. Review the transport relevant State aid rules	50
<b>6.6</b>	6.6. Initiation of deployment of RIS through transposition of EU directives, standards, preparation of project documentation and deployment	51
<b>8.10</b>	8.10. Improving inland waterways through prioritisation of INLAND WATERWAYS projects and Implementation of economic investment plan Flagship 1 projects	52
<b>4.5</b>	4.5. Participation in the NAIADES III Programme as observers, potential participation in Inland waterway and MoS Projects through CEF II	53

## Bosnia and Herzegovina

No	Actions	Ranking total
1.1 1.2	1.1. Transposition of alternative fuel directive 1.2. Deployment of e charging stations on the busiest corridors	1
4.1	4.1. Improving multimodality through transposition of intermodal/multimodal legislative framework	2
1.4 1.6	1.4. Aligning the emission standards across the region, by setting the minimum standard for new cars at EURO6 1.6. Improve emission testing in roadworthiness checks	3
4.6	4.6. Rail Corridor Initiative – Western Balkans to join the Rail Freight Corridors	4
4.2 4.3 4.4	4.2. Assessment of bottlenecks in modal interconnections and the current incentive system in place 4.3. Ensuring road/rail connections to TEN-T ports/ airports, freight terminals , and removing bottlenecks for intermodal transport 4.4. Construction of intermodal terminals and purchase of related equipment	5
3.1	3.1. Encourage regional capitals and assist in defining sustainable urban mobility solutions for the major urban nodes along the core network (last mile solutions)	6
8.10	8.10. Improving inland waterways through prioritisation of INLAND WATERWAYS projects and Implementation of economic investment plan Flagship 1 projects	7
3.2	3.2. Introduction of regionally aligned Public Service Obligation for international passenger rail transport	8
3.3	3.3. Better manage and coordinate international rail traffic, including if necessary, through revised rules for capacity allocation and infrastructure charging in rail	9
6.7	6.7. Deployment of Mobility as a Service (pax and freight) applications and digital transport corridors, smart mobility solutions and multimodal travel information services	10
2.2	2.2. Setting the foundation for deployment of alternative fuels infrastructure through transposition of relevant EU acquis in the air and waterborne sectors	11
3.4	3.4. Transposition of the Provisions of the Fourth Railway Package.	12
1.5	1.5. Encouraging the introduction of incentives for zero-emission vehicles	13
6.9	6.9. Enable environment for multimodal ticketing in passenger transport and transpose relevant legislation.	14
6.3	6.3. Initiation of deployment of ERTMS through transposition of EU directives, TSIs, preparation of project documentation and deployment	15

<b>6.4</b>	6.4. Deployment of ITS through transposition of EU directives, standards, preparation of project documentation and deployment	16
<b>8.12</b>	8.12. Open Public Funds for Railway Fleet Renewal for Passenger and Freight transport	17
<b>1.3</b>	1.3. Undertake feasibility study on the use of hydrogen on trucks along the busiest corridors	18
<b>6.8</b>	6.8. Initiating deployment of 5G transport corridors across region on Core and Comprehensive Network	19
<b>8.7</b>	8.7. Electrification of the rail core network and implementation of Flagship 1, 2, 3	20
<b>5.2</b>	5.2. Adopt and implement guidelines for operators and platforms to inform passengers about the carbon footprint of their trip and to enable passengers to voluntarily offset it, and for wider use of eco-routing for (in-built) navigation software	21
<b>8.4</b> <b>8.5</b>	8.4. Adopt guidelines to assess climate change and natural hazards of road network 8.5. Developing and implementing climate resilience plans for RPs transport networks	22
<b>4.5</b>	4.5. Participation in the NAIADES III Programme as observers, potential participation in Inland waterway and MoS Projects through CEF II	23
<b>8.9</b>	8.9. Reforming the railway sector through transposition and implementation of Market opening, passenger rights, interoperability, border crossings/ common crossings legislation	24
<b>8.6</b>	8.6. Establishing efficient road maintenance through multiannual road maintenance plans and Road Asset Management Systems	25
<b>5.3</b>	5.3. Deployment of e-tolling and achieving interoperability of electronic road toll systems and facilitating cross-border exchange of information	26
<b>8.1</b> <b>8.2</b>	8.1. Revisiting national transport strategies and prioritising green elements 8.2. Capacity building for administration on green and digital transformation of transport	27
<b>7.7</b>	7.7. Adopt the regulatory framework for drones and unmanned aircraft	28
<b>7.8</b> <b>7.9</b>	7.8. Adopt the EU type approval legislation to facilitate car data-based services including interaction with energy system 7.9. Adopt regulatory framework to open access to car data to mobility services	29
<b>8.8</b>	8.8. Improvement of road and rail border crossings / common crossings (removal of administrative bottlenecks, additional parking lanes, construction of joint BCPs/CCPs)	30
<b>10.1</b>	10.1. Improving road safety management, enabling safer infrastructure a better protection of road users	31
<b>7.5</b>	7.5. Establish national access point under ITS Directive and join European mobility data space	32

<b>7.6</b>	7.6. Adopt rules on a trusted environment for corridor data exchange to support collaborative logistics	33
<b>10.3</b> <b>10.5</b> <b>10.6</b>	10.3. Improve domestic legislation transposing transport of dangerous goods Acquis 10.5. Enforcement procedures for transport of dangerous goods to be put in place for rail, road and inland waterways 10.6. Enhance research on transport of dangerous goods	34
<b>7.1</b> <b>7.2</b> <b>7.3</b> <b>7.4</b>	7.1. Develop R&I partnerships within the region and with EU bodies 7.2. Encourage public companies/institutions/universities to establish innovation centres 7.3. Improve coordination between public authorities, universities, NGOs on regional to encourage interdisciplinary research in green and digital mobility 7.4. Increase the awareness and educate young leaders, officials, and other relevant stakeholders on greening of transport	35
<b>6.2</b>	6.2. Use of modern software at border crossing points /common crossing points (such as e-qms, NCTS, SEED, NSW, Galileo app)	36
<b>7.10</b>	7.10. Undertake impact assessment and prepare roadmap for AI for mobility	37
<b>6.6</b>	6.6. Initiation of deployment of RIS through transposition of EU directives, standards, preparation of project documentation and deployment	38
<b>9.4</b>	9.4. Prepare a Blueprint to tackle the challenges that come with the digitalisation and modernisation of the transport sector (ageing workforce, staff shortage and skills mismatch).	39
<b>9.5</b>	9.5. Complete transposition and implementation of the relevant social policy legislation in the Transport Community Treaty	40
<b>9.6</b>	9.6. Review of the guidelines on the Land PSO Regulation and provide guidance on freight PSOs	41
<b>10.4</b>	10.4. Enhance mechanisms for market surveillance, cooperation on standardisation	42
<b>6.10</b>	6.10. Assess the needs for setting up agencies or other bodies to support safe, smart and sustainable road transport operations	43
<b>9.1</b> <b>9.2</b> <b>9.3</b>	9.1. Setting up a Platform for Change and removal of legal barriers to women's economic empowerment 9.2. Play an active role to assist regional institutions in removal of legal barriers to women's economic empowerment opportunities 9.3. Encourage IFIs, Ministries in charge of transport and Transport Departments within the Universities across the region to develop grant schemes for women internships in transport sector	44
<b>10.2</b>	10.2. Prepare and adopt Road Safety National Strategy and set road safety targets for the next decade 2021-2030	45
<b>8.3</b>	8.3. Development of cost effectiveness analysis of the Sustainable and Smart Mobility Strategy Western Balkans Perspective and elaboration of detailed action plans per each Regional Party	46

<b>5.1</b>	5.1. Establish EU framework for harmonised measurement of transport and logistics emissions	47
<b>5.4</b>	5.4. Establish Transport Community Transport Observatory Database and Information System (TODIS)	48
<b>6.11</b>	6.11. Transpose the EU legal framework on the approval of connected and automated vehicles	49
<b>8.11</b>	8.11. Review the transport relevant State aid rules	50
<b>2.1</b>	2.1. Follow up on deliverables of INTERREG projects regarding Action Plans for Greening of the Ports of Bar and Durres	51
<b>6.1</b>	6.1. Enable B2A multimodal data exchange through implementation of the e-FTI Regulation and Maritime Single Window environment	52
<b>6.5</b>	6.5. Initiation of deployment of VTMS and e maritime services through transposition of EU directives, standards, preparation of project documentation and deployment	53



## Kosovo

No	Actions	Ranking total
1.1 1.2	1.1. Transposition of alternative fuel directive 1.2. Deployment of e charging stations on the busiest corridors	1
4.1	4.1. Improving multimodality through transposition of intermodal/multimodal legislative framework	2
1.4 1.6	1.4. Aligning the emission standards across the region, by setting the minimum standard for new cars at EURO6 1.6. Improve emission testing in roadworthiness checks	3
4.6	4.6. Rail Corridor Initiative – Western Balkans to join the Rail Freight Corridors	4
4.2 4.3 4.4	4.2. Assessment of bottlenecks in modal interconnections and the current incentive system in place 4.3. Ensuring road/rail connections to TEN-T ports/ airports, freight terminals, and removing bottlenecks for intermodal transport 4.4. Construction of intermodal terminals and purchase of related equipment	5
3.1	3.1. Encourage regional capitals and assist in defining sustainable urban mobility solutions for the major urban nodes along the core network (last mile solutions)	6
3.2	3.2. Introduction of regionally aligned Public Service Obligation for international passenger rail transport	7
3.3	3.3. Better manage and coordinate international rail traffic, including if necessary, through revised rules for capacity allocation and infrastructure charging in rail	8
6.7	6.7. Deployment of Mobility as a Service (pax and freight) applications and digital transport corridors, smart mobility solutions and multimodal travel information services	9
3.4	3.4. Transposition of the Provisions of the Fourth Railway Package.	10
1.5	1.5. Encouraging the introduction of incentives for zero-emission vehicles	11
6.9	6.9. Enable environment for multimodal ticketing in passenger transport and transpose relevant legislation.	12
6.3	6.3. Initiation of deployment of ERTMS through transposition of EU directives, TSIs, preparation of project documentation and deployment	13
6.4	6.4. Deployment of ITS through transposition of EU directives, standards, preparation of project documentation and deployment	14
8.12	8.12. Open Public Funds for Railway Fleet Renewal for Passenger and Freight transport	15
1.3	1.3. Undertake feasibility study on the use of hydrogen on trucks along the busiest corridors	16

<b>6.8</b>	6.8. Initiating deployment of 5G transport corridors across region on Core and Comprehensive Network	17
<b>8.9</b>	8.9. Reforming the railway sector through transposition and implementation of Market opening, passenger rights, interoperability, border crossings/ common crossings legislation	18
<b>5.2</b>	5.2. Adopt and implement guidelines for operators and platforms to inform passengers about the carbon footprint of their trip and to enable passengers to voluntarily offset it, and for wider use of eco-routing for (in-built) navigation software	19
<b>8.7</b>	8.7. Electrification of the rail core network and implementation of Flagship 1, 2, 3	20
<b>8.4</b> <b>8.5</b>	8.4. Adopt guidelines to assess climate change and natural hazards of road network 8.5. Developing and implementing climate resilience plans for RPs transport networks	21
<b>8.6</b>	8.6. Establishing efficient road maintenance through multiannual road maintenance plans and Road Asset Management Systems	22
<b>5.3</b>	5.3. Deployment of e-tolling and achieving interoperability of electronic road toll systems and facilitating cross-border exchange of information	23
<b>8.1</b> <b>8.2</b>	8.1. Revisiting national transport strategies and prioritising green elements 8.2. Capacity building for administration on green and digital transformation of transport	24
<b>7.7</b>	7.7. Adopt the regulatory framework for drones and unmanned aircraft	25
<b>7.8</b> <b>7.9</b>	7.8. Adopt the EU type approval legislation to facilitate car data-based services including interaction with energy system 7.9. Adopt regulatory framework to open access to car data to mobility services	26
<b>8.8</b>	8.8. Improvement of road and rail border crossings / common crossings (removal of administrative bottlenecks, additional parking lanes, construction of joint BCPs/CCPs)	27
<b>10.1</b>	10.1. Improving road safety management, enabling safer infrastructure a better protection of road users	28
<b>7.5</b>	7.5. Establish national access point under ITS Directive and join European mobility data space	29
<b>7.6</b>	7.6. Adopt rules on a trusted environment for corridor data exchange to support collaborative logistics	30
<b>10.3</b> <b>10.5</b> <b>10.6</b>	10.3. Improve domestic legislation transposing transport of dangerous goods Acquis 10.5. Enforcement procedures for transport of dangerous goods to be put in place for rail, road and inland waterways 10.6. Enhance research on transport of dangerous goods	31

<b>7.1</b>	7.1. Develop R&I partnerships within the region and with EU bodies	32
<b>7.2</b>	7.2. Encourage public companies/institutions/universities to establish innovation centres	
<b>7.3</b>	7.3. Improve coordination between public authorities, universities, NGOs on regional to encourage interdisciplinary research in green and digital mobility	
<b>7.4</b>	7.4. Increase the awareness and educate young leaders, officials, and other relevant stakeholders on greening of transport	
<b>6.2</b>	6.2. Use of modern software at border crossing points /common crossing points (such as e-qms, NCTS, SEED, NSW, Galileo app)	33
<b>7.10</b>	7.10. Undertake impact assessment and prepare roadmap for AI for mobility	34
<b>9.4</b>	9.4. Prepare a Blueprint to tackle the challenges that come with the digitalisation and modernisation of the transport sector (ageing workforce, staff shortage and skills mismatch).	35
<b>9.5</b>	9.5. Complete transposition and implementation of the relevant social policy legislation in the Transport Community Treaty	36
<b>9.6</b>	9.6. Review of the guidelines on the Land PSO Regulation and provide guidance on freight PSOs	37
<b>10.4</b>	10.4. Enhance mechanisms for market surveillance, cooperation on standardisation	38
<b>6.10</b>	6.10. Assess the needs for setting up agencies or other bodies to support safe, smart and sustainable road transport operations	39
<b>9.1</b>	9.1. Setting up a Platform for Change and removal of legal barriers to women's economic empowerment	40
<b>9.2</b>	9.2. Play an active role to assist regional institutions in removal of legal barriers to women's economic empowerment opportunities	
<b>9.3</b>	9.3. Encourage IFIs, Ministries in charge of transport and Transport Departments within the Universities across the region to develop grant schemes for women internships in transport sector	
<b>10.2</b>	10.2. Prepare and adopt Road Safety National Strategy and set road safety targets for the next decade 2021-2030	41
<b>8.3</b>	8.3. Development of cost effectiveness analysis of the Sustainable and Smart Mobility Strategy Western Balkans Perspective and elaboration of detailed action plans per each Regional Party	42
<b>5.1</b>	5.1. Establish EU framework for harmonised measurement of transport and logistics emissions	43
<b>2.1</b>	2.1. Follow up on deliverables of INTERREG projects regarding Action Plans for Greening of the Ports of Bar and Durres	44
<b>5.4</b>	5.4. Establish Transport Community Transport Observatory Database and Information System (TODIS)	45
<b>6.11</b>	6.11. Transpose the EU legal framework on the approval of connected and automated vehicles	46
<b>8.11</b>	8.11. Review the transport relevant State aid rules	47

<b>2.2</b>	2.2. Setting the foundation for deployment of alternative fuels infrastructure through transposition of relevant EU acquis in the air and waterborne sectors	48
<b>6.1</b>	6.1. Enable B2A multimodal data exchange through implementation of the e-FTI Regulation and Maritime Single Window environment	49
<b>8.10</b>	8.10. Improving inland waterways through prioritisation of INLAND WATERWAYS projects and Implementation of economic investment plan Flagship 1 projects	50
<b>6.6</b>	6.6. Initiation of deployment of RIS through transposition of EU directives, standards, preparation of project documentation and deployment	51
<b>4.5</b>	4.5. Participation in the NAIADES III Programme as observers, potential participation in Inland waterway and MoS Projects through CEF II	52
<b>6.5</b>	6.5. Initiation of deployment of VTMS and e maritime services through transposition of EU directives, standards, preparation of project documentation and deployment	53

## Montenegro

No	Actions	Ranking total
1.1 1.2	1.1. Transposition of alternative fuel directive 1.2. Deployment of e charging stations on the busiest corridors	1
4.1	4.1. Improving multimodality through transposition of intermodal/multimodal legislative framework	2
1.4 1.6	1.4. Aligning the emission standards across the region, by setting the minimum standard for new cars at EURO6 1.6. Improve emission testing in roadworthiness checks	3
4.6	4.6. Rail Corridor Initiative – Western Balkans to join the Rail Freight Corridors	4
4.2 4.3 4.4	4.2. Assessment of bottlenecks in modal interconnections and the current incentive system in place 4.3. Ensuring road/rail connections to TEN-T ports/ airports, freight terminals , and removing bottlenecks for intermodal transport 4.4. Construction of intermodal terminals and purchase of related equipment	5
3.1	3.1. Encourage regional capitals and assist in defining sustainable urban mobility solutions for the major urban nodes along the core network (last mile solutions)	6
3.2	3.2. Introduction of regionally aligned Public Service Obligation for international passenger rail transport	7
3.3	3.3. Better manage and coordinate international rail traffic, including if necessary, through revised rules for capacity allocation and infrastructure charging in rail	8
6.7	6.7. Deployment of Mobility as a Service (pax and freight) applications and digital transport corridors, smart mobility solutions and multimodal travel information services	9
2.2	2.2. Setting the foundation for deployment of alternative fuels infrastructure through transposition of relevant EU acquis in the air and waterborne sectors	10
3.4	3.4. Transposition of the Provisions of the Fourth Railway Package.	11
1.5	1.5. Encouraging the introduction of incentives for zero-emission vehicles	12
6.9	6.9. Enable environment for multimodal ticketing in passenger transport and transpose relevant legislation.	13
6.4	6.4. Deployment of ITS through transposition of EU directives, standards, preparation of project documentation and deployment	14
8.12	8.12. Open Public Funds for Railway Fleet Renewal for Passenger and Freight transport	15

1.3	1.3. Undertake feasibility study on the use of hydrogen on trucks along the busiest corridors	16
6.8	6.8. Initiating deployment of 5G transport corridors across region on Core and Comprehensive Network	17
8.9	8.9. Reforming the railway sector through transposition and implementation of Market opening, passenger rights, interoperability, border crossings/ common crossings legislation	18
5.2	5.2. Adopt and implement guidelines for operators and platforms to inform passengers about the carbon footprint of their trip and to enable passengers to voluntarily offset it, and for wider use of eco-routing for (in-built) navigation software	19
8.7	8.7. Electrification of the rail core network and implementation of Flagship 1, 2, 3	20
8.4 8.5	8.4. Adopt guidelines to assess climate change and natural hazards of road network 8.5. Developing and implementing climate resilience plans for RPs transport networks	21
6.1	6.1. Enable B2A multimodal data exchange through implementation of the e-FTI Regulation and Maritime Single Window environment	22
6.3	6.3. Initiation of deployment of ERTMS through transposition of EU directives, TSIs, preparation of project documentation and deployment	23
6.5	6.5. Initiation of deployment of VTMS and e maritime services through transposition of EU directives, standards, preparation of project documentation and deployment	24
8.6	8.6. Establishing efficient road maintenance through multiannual road maintenance plans and Road Asset Management Systems	25
2.1	2.1. Follow up on deliverables of INTERREG projects regarding Action Plans for Greening of the Ports of Bar and Durres	26
5.3	5.3. Deployment of e-tolling and achieving interoperability of electronic road toll systems and facilitating cross-border exchange of information	27
8.1 8.2	8.1. Revisiting national transport strategies and prioritising green elements 8.2. Capacity building for administration on green and digital transformation of transport	28
7.7	7.7. Adopt the regulatory framework for drones and unmanned aircraft	29
7.8 7.9	7.8. Adopt the EU type approval legislation to facilitate car data-based services including interaction with energy system 7.9. Adopt regulatory framework to open access to car data to mobility services	30
8.8	8.8. Improvement of road and rail border crossings / common crossings (removal of administrative bottlenecks, additional parking lanes, construction of joint BCPs/CCPs)	31
10.1	10.1. Improving road safety management, enabling safer infrastructure a better protection of road users	32

<b>7.5</b>	7.5. Establish national access point under ITS Directive and join European mobility data space	33
<b>7.6</b>	7.6. Adopt rules on a trusted environment for corridor data exchange to support collaborative logistics	34
<b>10.3</b> <b>10.5</b> <b>10.6</b>	10.3. Improve domestic legislation transposing transport of dangerous goods Acquis 10.5. Enforcement procedures for transport of dangerous goods to be put in place for rail, road and inland waterways 10.6. Enhance research on transport of dangerous goods	35
<b>7.1</b> <b>7.2</b> <b>7.3</b> <b>7.4</b>	7.1. Develop R&I partnerships within the region and with EU bodies 7.2. Encourage public companies/institutions/universities to establish innovation centres 7.3. Improve coordination between public authorities, universities, NGOs on regional to encourage interdisciplinary research in green and digital mobility 7.4. Increase the awareness and educate young leaders, officials, and other relevant stakeholders on greening of transport	36
<b>6.2</b>	6.2. Use of modern software at border crossing points /common crossing points (such as e-qms, NCTS, SEED, NSW, Galileo app)	37
<b>7.10</b>	7.10. Undertake impact assessment and prepare roadmap for AI for mobility	38
<b>9.4</b>	9.4. Prepare a Blueprint to tackle the challenges that come with the digitalisation and modernisation of the transport sector (ageing workforce, staff shortage and skills mismatch).	39
<b>9.5</b>	9.5. Complete transposition and implementation of the relevant social policy legislation in the Transport Community Treaty	40
<b>9.6</b>	9.6. Review of the guidelines on the Land PSO Regulation and provide guidance on freight PSOs	41
<b>10.4</b>	10.4. Enhance mechanisms for market surveillance, cooperation on standardisation	42
<b>6.10</b>	6.10. Assess the needs for setting up agencies or other bodies to support safe, smart and sustainable road transport operations	43
<b>9.1</b> <b>9.2</b> <b>9.3</b>	9.1. Setting up a Platform for Change and removal of legal barriers to women's economic empowerment 9.2. Play an active role to assist regional institutions in removal of legal barriers to women's economic empowerment opportunities 9.3. Encourage IFIs, Ministries in charge of transport and Transport Departments within the Universities across the region to develop grant schemes for women internships in transport sector	44
<b>10.2</b>	10.2. Prepare and adopt Road Safety National Strategy and set road safety targets for the next decade 2021-2030	45
<b>8.3</b>	8.3. Development of cost effectiveness analysis of the Sustainable and Smart Mobility Strategy Western Balkans Perspective and elaboration of detailed action plans per each Regional Party	46
<b>5.1</b>	5.1. Establish EU framework for harmonised measurement of transport and logistics emissions	47

<b>5.4</b>	5.4. Establish Transport Community Transport Observatory Database and Information System (TODIS)	48
<b>6.11</b>	6.11. Transpose the EU legal framework on the approval of connected and automated vehicles	49
<b>8.11</b>	8.11. Review the transport relevant State aid rules	50
<b>8.10</b>	8.10. Improving inland waterways through prioritisation of INLAND WATERWAYS projects and Implementation of economic investment plan Flagship 1 projects	51
<b>6.6</b>	6.6. Initiation of deployment of RIS through transposition of EU directives, standards, preparation of project documentation and deployment	52
<b>4.5</b>	4.5. Participation in the NAIADES III Programme as observers, potential participation in Inland waterway and MoS Projects through CEF II	53



## North Macedonia

No	Actions	Ranking total
1.1 1.2	1.1. Transposition of alternative fuel directive 1.2. Deployment of e charging stations on the busiest corridors	1
4.1	4.1. Improving multimodality through transposition of intermodal/multimodal legislative framework	2
1.4 1.6	1.4. Aligning the emission standards across the region, by setting the minimum standard for new cars at EURO6 1.6. Improve emission testing in roadworthiness checks	3
4.6	4.6. Rail Corridor Initiative – Western Balkans to join the Rail Freight Corridors	4
4.2 4.3 4.4	4.2. Assessment of bottlenecks in modal interconnections and the current incentive system in place 4.3. Ensuring road/rail connections to TEN-T ports/ airports, freight terminals , and removing bottlenecks for intermodal transport 4.4. Construction of intermodal terminals and purchase of related equipment	5
3.1	3.1. Encourage regional capitals and assist in defining sustainable urban mobility solutions for the major urban nodes along the core network (last mile solutions)	6
3.2	3.2. Introduction of regionally aligned Public Service Obligation for international passenger rail transport	7
3.3	3.3. Better manage and coordinate international rail traffic, including if necessary, through revised rules for capacity allocation and infrastructure charging in rail	8
6.7	6.7. Deployment of Mobility as a Service (pax and freight) applications and digital transport corridors, smart mobility solutions and multimodal travel information services	9
3.4	3.4. Transposition of the Provisions of the Fourth Railway Package.	10
1.5	1.5. Encouraging the introduction of incentives for zero-emission vehicles	11
6.9	6.9. Enable environment for multimodal ticketing in passenger transport and transpose relevant legislation.	12
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<b>8.9</b>	8.9. Reforming the railway sector through transposition and implementation of Market opening, passenger rights, interoperability, border crossings/ common crossings legislation	18
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<b>9.1</b>	9.1. Setting up a Platform for Change and removal of legal barriers to women's economic empowerment	40
<b>9.2</b>	9.2. Play an active role to assist regional institutions in removal of legal barriers to women's economic empowerment opportunities	
<b>9.3</b>	9.3. Encourage IFIs, Ministries in charge of transport and Transport Departments within the Universities across the region to develop grant schemes for women internships in transport sector	
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3.3	3.3. Better manage and coordinate international rail traffic, including if necessary, through revised rules for capacity allocation and infrastructure charging in rail	9
6.7	6.7. Deployment of Mobility as a Service (pax and freight) applications and digital transport corridors, smart mobility solutions and multimodal travel information services	10
2.2	2.2. Setting the foundation for deployment of alternative fuels infrastructure through transposition of relevant EU acquis in the air and waterborne sectors	11
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1.5	1.5. Encouraging the introduction of incentives for zero-emission vehicles	13
6.9	6.9. Enable environment for multimodal ticketing in passenger transport and transpose relevant legislation.	14
6.4	6.4. Deployment of ITS through transposition of EU directives, standards, preparation of project documentation and deployment	15

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## Annex No.3 Project Synopsis

Project title:	Technical Assistance to Connectivity in the Western Balkans (CONNECTA)
Sub-project title:	Technical Assistance for the Deployment of Smart and Sustainable Mobility in the Western Balkans
Sub-project number:	CONNECTA TRA-CRM-REG-MOB-07 (Europe Aid/137850/IH/SER/MULTI)
Contract number:	2016/382-382
Contracting Authority:	European Commission, DG NEAR
Beneficiaries:	Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, Serbia
Region:	South Eastern Europe (SEE)
Contractor:	Mott MacDonald Ltd. (UK) in Consortium with WYG, CeS COWI, TRENECON, SYSTEMA
Administrative Order:	03.03.2022
Mobilisation started:	09.03.2022 (Kick-off Meeting with TCPS on 08.03.2022)
Sub-Project Duration:	16 months
Anticipated completion:	30.06.2023.
Responsible Transport KE:	Giorgos Xanthakos
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## Annex No.4 Issue and revision record

• Revision	• Date	• Originator	• Checker	• Approver	• Description
1	30/05/2023	Seth Landau (Sustainability Expert /Component Co-Leader)	Danijel Vuckovic (Project Manager)		Draft Deliverable 4 “Final Report – Component 1 - Baseline scenario and analysis of the Sustainable and Smart Mobility Strategy (SSMS) for the Western Balkans roadmap”
2	19/07/2023	Seth Landau (Sustainability Expert /Component Co-Leader)	Danijel Vuckovic (Project Manager)		Draft Deliverable 4 “Final Report – Component 1 - Baseline scenario and analysis of the Sustainable and Smart Mobility Strategy (SSMS) for the Western Balkans roadmap”
3	24/07/2023	Seth Landau (Sustainability Expert /Component Co-Leader)	Danijel Vuckovic (Project Manager)		Draft Deliverable 4 “Final Report – Component 1 - Baseline scenario and analysis of the Sustainable and Smart Mobility Strategy (SSMS) for the Western Balkans roadmap”
4	18/08/2023	Seth Landau (Sustainability Expert /Component Co-Leader)	Danijel Vuckovic (Project Manager)		Final Deliverable 4 “Final Report – Component 1 - Baseline scenario and analysis of the Sustainable and Smart Mobility Strategy (SSMS) for the Western Balkans roadmap”

• Information class: • Standard

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## Annex No.5 List of abbreviations

Abbreviation	Meaning
ADN	The European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR	The Agreement concerning the International Carriage of Dangerous Goods by Road
AI	Artificial Intelligence
AMS	Asset Management System
AWB RFC	Alpine-Western Balkan Rail Freight Corridor
BAS	Institute for Standardisation of Bosnia and Herzegovina
BAU	Business As Usual
BCP	Border Crossing Point
BiH	Bosnia and Herzegovina
BUR	Biennial Update Report
CAPEX	Capital Expenditure
CBA	Cost-benefit Analysis
CCP	Common Crossing Point
CEA	Cost-Effectiveness Analysis
CEE	Central and Eastern Europe Countries
CEF	Connecting Europe Facility
CEFTA	Central European Free Trade Agreement
COP	Conference of the Parties
C-OSSP	Corridor One Stop Shop
COTIF	The Convention concerning International Carriage by Rail (applies in Europe, the Maghreb, and the Middle East)
CRMMP	Connectivity Reform Measure Management Plan
DEU	Delegation of EU in RPs
DPSP	Albania General Directorate of Standardisation
EASA	European Union Aviation Safety Agency
EC	European Commission
ECDIS	Electronic chart display and information system for inland navigation
ECV	European Centralised Virtual Vehicle Register
EEA	European Environment Agency
EETS	European Electronic Tolling Service
e-QMS	Electronic Queue Management System
EMSA	European Maritime Safety Agency
EMSW	European Maritime Single Window environment
ERA	European Union Agency for Railways
ERTMS	European Rail Traffic Management System
EU	European Union
EVC	European Centralised Virtual Vehicle Register
EVCS	Electric vehicle charging station

Abbreviation	Meaning
FAL Convention	Convention on Facilitation of International Maritime Traffic
GCAP	Green City Action Plan
GDP	Gross Domestic Product
GHG	Greenhouse gas
GIS	Geographic information system
GIZ	German Agency for International Cooperation GmbH
GNSS Agency	Global Navigation Satellite Systems Agency
HCV	Heavy Commercial Vehicle
HGV	Heavy Goods Vehicles
ICAO	International Civil Aviation Organisation
ICE	Internal Combustion Engines
ICT	Information and Communication Technologies
IEA	International Energy Agency
IMO	International Maritime Organisation
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
ISME	Institute for Standardisation of Montenegro
ISO	International Organisation for Standardisation
ISRM	Standardisation Institute of the Republic of Macedonia
ISS	Institute for Standardisation of Serbia
ITC	Inland Transport Committee
ITS	Intelligent Transport Systems
IWT	Inland Waterway Transport
IWW	Inland Waterway
JARUS	Joint Authorities for Rulemaking on Unmanned Systems
KPI	Key Performance Indicator
KSA	Kosovo Standardisation Agency
LCA	Least-Cost Analysis
LDV	Light Duty Vehicle
LGV	Light Goods Vehicles
LNG	liquefied natural gas
LPG	liquefied petroleum gas
MaaS	Mobility as a Service
MCA	multi-criteria analysis
MS	Member States
M&R	Maintenance & Renewal
NCA	National Competition Authority
NCTS	New Computerised Transport System
NDC	National Determined Contribution
NECP	National Energy and Climate Plans
NGO	Non-Governmental Organisation

Abbreviation	Meaning
NMSW	National Maritime Single Window
NPV	Net Present Value
NRMM	Non-road mobile machinery
OPEX	Operational Expenditure
PIARC	Permanent International Association of Road Congresses
pkm	Passenger-kilometre
PSC	Public Service Contracts
PSO	Public Service Obligation
RCC	Regional Cooperation Council
REBIS	Regional Balkan Infrastructure Study
RES	Renewable Energy Sources
RFC	Rail Freight Corridor
R&I	Research and Innovation
RIA	Railway Infrastructure Assets
RID	The Regulation concerning the International Carriage of Dangerous Goods by Rail (forms Appendix C to COTIF, and has an annex)
RIMAROCC	Risk Management for Roads in a Changing Climate
RINF	European Registers of Infrastructure
RIS	River Information Services
rkm	River kilometre
ROADAPT	Roads for Today, Adapted for Tomorrow
RoRo	Roll-on/roll-off
RP	Regional Party
RSA	Rolling Stock Assets
RSL	Residual Service Life
SEED	System for Electronic Exchange of Data
SOx	sulphur oxides
SSMS	Sustainable and Smart Mobility Strategy
SSMS WB	Sustainable and Smart Mobility Strategy for Western Balkan
S2R	Shift-to-Rail
SUMP	Sustainable Urban Mobility Plan
TA	Technical Assistance
TAIEX	Technical Assistance and Information Exchange Instrument
TCPS	Transport Community Permanent Secretariat
TCT	Transport Community Treaty
TDG	Transport of Dangerous Goods
TEN-T	Trans-European Network for Transport
TERM	Transport and Environment Reporting Mechanism
TEU	Twenty-foot equivalent unit
TFEU	Functioning of the European Union
tkm	Tonne-kilometre
TODIS	Transport Observatory Database/Information System

Abbreviation	Meaning
UIC	International Union of Railways
UNFCCC	United Nations Framework Convention on Climate Change
UVAR	Urban Vehicle Access Regulation
VAT	Value Added Tax
VTMIS	Vessel Traffic Management and Information System
WB6	Western Balkans

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