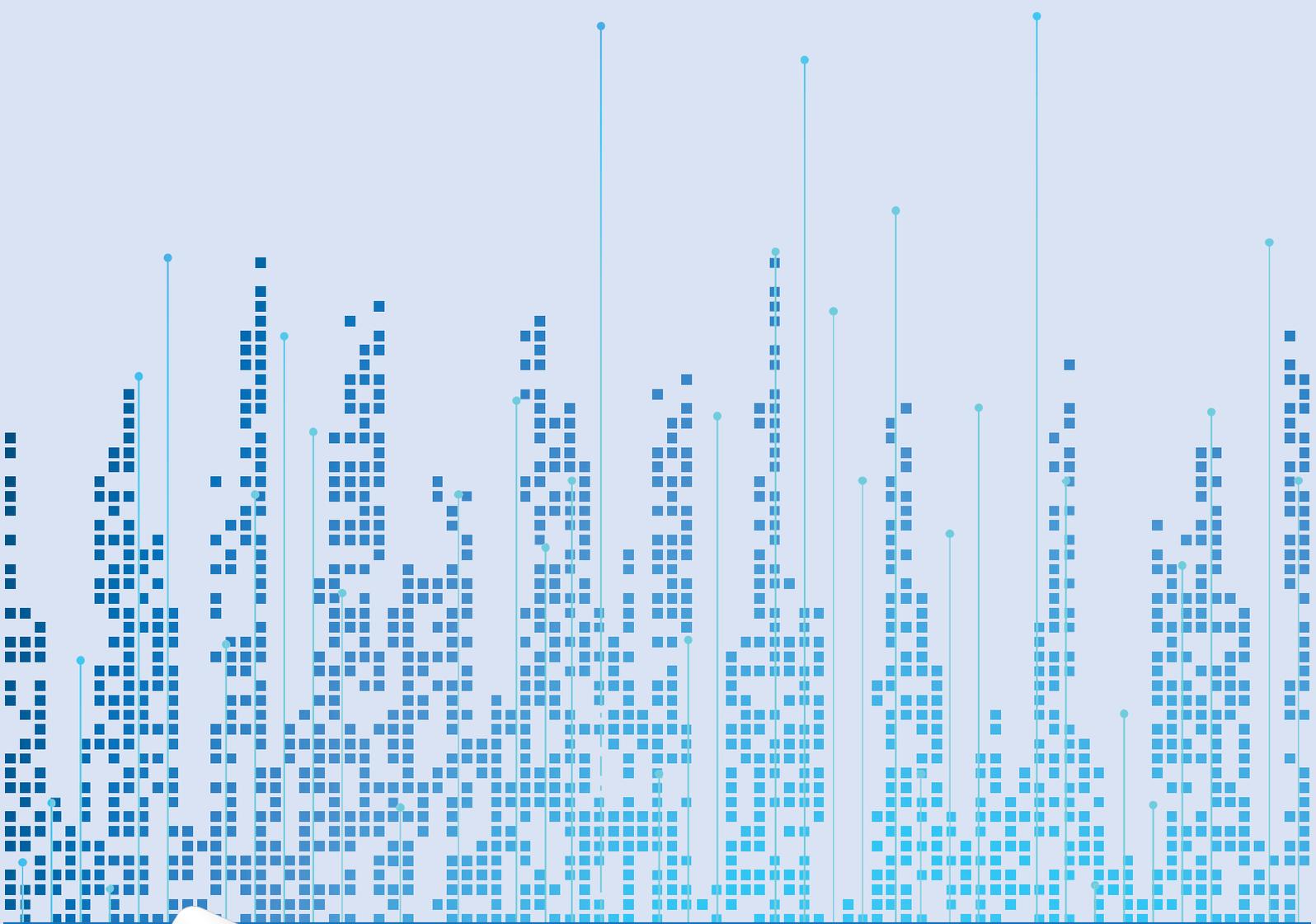


National Development Strategy Croatia 2030 Policy Note:

Transport Sector

July 2019



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Note

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Contents

- 1 Executive Summary 4
- 2 Overview of the global / regional trends and societal challenges (including best practices) 7
 - 2.1 Global trends in freight 7
 - 2.2 Global trends in passenger movement 7
 - 2.3 The global need for greener transport 8
 - 2.4 Regional push for reintegration of transport networks 9
- 3 Overview of developments in Croatia 10
 - 3.1 Overarching context for transport across Strategic Pillars 10
 - 3.2 Developments within and between modes of transport 12
 - 3.3 Croatia and the Trans-European Network – Transport 17
 - 3.4 Trends in Croatia’s emissions from transport 18
- 4 Assessment of the main development challenges & opportunities 20
 - 4.1 Pillar 1: facilitating movement of people to support services-led growth 20
 - 4.2 Pillar 2: “enhanced freight and logistics for competitiveness” 24
 - 4.3 Pillar 3: “developing high value jobs in transport-related industries” 26
- 5 Prioritized policy recommendations 28
- 6 Proposed implementation roadmap for Policy Actions 32
- 7 Proposals for strategic (“Flagship”) projects 33
- Anex 1: Ideas to support of “Flagship” initiatives 35

1 Executive Summary

1. Croatia's Transport Development Strategy (2017-2030) provides 9 General Objectives and 45 Specific Objectives relating to public transport and zero emissions modes, road transport, railway transport, air transport, maritime transport, inland waterways, and cross sectoral considerations. General objectives include:

- Developing the passenger modal split in favor of public transport and zero emission modes;
- Developing the freight modal split in favor of rail transport, maritime freight transport, and inland water transport;
- Developing the transport system (operation, organization and infrastructure development and maintenance) according to the principle of economic sustainability;
- Reducing the climate change impact of the Croatian transport system;
- Reducing the impact on the environment of the Croatian transport system;
- Improve the traffic safety in the Croatian transport system;
- Improve the interoperability of the Croatian transport system;
- Improve the integration of transport modes in Croatia; and
- To further develop the Croatian Trans-European Transport Network (TEN-T).

2. There is a need to translate these objectives into interventions under Croatia's National Development Strategy and to also enhance the broader economic value derived from transport related enterprises in Croatia. This paper recommends three pillars for action including:

- ***Pillar 1 “facilitating movement of people to support services-led growth”*** Specific first priority interventions under this pillar include: (i) increasing the capacity, frequency, inter-modal integration, and quality of suburban and regional passenger rail services from Zagreb and Split; and (ii) implementing an aggressive road safety program to bring Croatia's road safety performance into line with EU best practice; and (iii) increasing the quality, speed, and frequency of international rail passenger services with Croatia's EU and Western Balkans neighbors. Priorities for rail passenger service can also be coupled with regional bus services should Croatia choose to use connectivity as a tool for “catching up” development in regions such as Slavonia (particularly along the RH1 corridor which is densely served by railway transport). Secondary priorities for government intervention include: (i) development of secondary and tertiary airports with a view to enhancing point-to-point connections with major origin /destination cities in the EU and elsewhere; and (ii) development of a national electric mobility program.
- ***Pillar 2 “enhanced freight and logistics for competitiveness”*** Croatia has invested significantly in the development of a world-class road network and in the development of additional container capacity at the Port of Rijeka. The foremost national development priority relates to implementing rail connectivity investments at the port of Rijeka and along railways corridors (RH1 and RH2) that can support greener and safer freight movements relative to roads. These efforts should include developing a “lowland” option between Ogulin and Škrlevo to further enhance Rijeka's competitiveness. Secondary priorities include: (i) development of Croatia's waterways routes along the Sava and Danube rivers; and (ii) development of secondary specialized ports at Zadar, and Šibenik. At present, it is unclear whether a market exists for increased waterways traffic beyond

what road and rail networks can adequately serve. Similarly, major investment in additional ports beyond Rijeka may not constitute an immediate development priority until demand for maritime transport increases further. However, smaller scale, lower cost investments may provide opportunities for probing whether a latent market exists.

- **Pillar 3 “developing high value jobs in transport-related industries”** Croatia can develop high-value jobs and employment around transport related industries and infrastructure. Specific priorities include: (i) expansion of the existing domestic electric-mobility industry into a cluster of industries; and (ii) development of Osijek airport as a hub for Maintenance, Renovation, and Overhaul (MRO) services for the European aviation industry. In both instances, physical interventions in site locations complemented by programs of skills development for workers would enhance the effectiveness of government support.

3. There are two important developments to consider as Croatia finalizes and executes the transport elements of its National Development Strategy. These include:

- (i) The recently signed “Treaty Establishing the Transport Community” (hereafter the “Treaty”) between the European Union and Western Balkans countries which offers opportunities for regional integration. The Treaty applies some of the most critical transport-related elements of the EU Aquis in support of enhanced physical and economic integration between the EU and Western Balkans. Croatia’s geographical configuration and contiguous borders with three Western Balkans neighbors offers a natural advantage for benefitting from the Treaty’s – if it can be effectively operationalized.
- (ii) Croatia’s upcoming presidency of the European Union which provides the opportunity to establish and drive a Europe-wide agenda on transport. The timing of Croatia’s EU presidency also coincides with preparations for the upcoming programming period of European Union funds that will shape the nature of transport investments from 2021-2027. A foremost priority for Croatia’s presidency should be the operationalization of the new Treaty.

4. Croatia is a relatively small country by population, land area, and overall volume of economic activity. Both Croatia’s upcoming EU presidency and the new Treaty therefore serve a central historical thesis for transport in Croatia which is the following: **connections beyond Croatia’s borders are a primary determinant of economic value derived from Croatia’s transport network**. The historical development of Croatia’s legacy transport network under both the former Austro-Hungarian Empire and former Socialist Federal Republic of Yugoslavia was predicated on regional connectivity with Central Europe and the Western Balkans. Fragmentation of these networks in the 20th century imposed exogenous obstacles to Croatia’s transport development. Similarly, Croatia’s own deindustrialization processes changed the type of transport infrastructure needed for growth and development. Reintegration of transport networks and realignment of Croatia’s transport infrastructure towards new needs are critical for recapturing the potential benefits that transport offers.

5. Key underlying policy challenges that Croatia’s transport sector can seek to address while implementing national priorities include: (i) stronger sector planning and project development functions within the Ministry of Sea, Transport and Infrastructure (MSTI); and (ii) enhanced sectoral funding and oversight mechanisms within the Ministry of Finance. Specifically, MSTI would benefit from an objectives-based planning approach and organizational structure (rather than sub-sectoral silos). The Ministry of Finance may similarly benefit from mechanisms to establish multi-annual funding programs that include stronger investment vetting and oversight functions. These are particularly critical to the management of major projects with long supply chains and the management of assets that require long term care and planning. In both cases, international experience from the EU and elsewhere has shown that annualized funding settlements severely compromise the speed and quality of transport sector

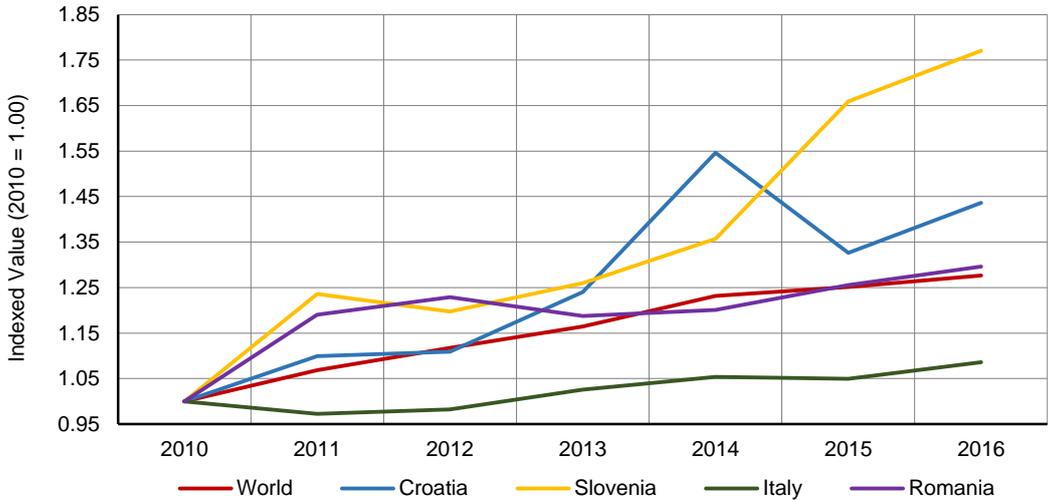
investments. Similarly, weak oversight functions have previously resulted in lower quality, and in some cases, contradictory investments in Croatia's transport infrastructure. Enhancing the Ministry of Finance's role in managing value for money from public funds spent on transport will increase the likelihood that the National Development Strategy can achieve its transport related goals. Stronger institutional capabilities within the Ministry of Finance could also support future efforts to deploy commercial financing in support of Croatia's transport sector.

2 Overview of the global / regional trends and societal challenges (including best practices)

2.1 Global trends in freight

6. *Global trade in goods continues to drive increased demand for transport services, most notably the movement of containers.* Global container traffic increased 28% between 2010 and 2016 in large part due to the continued growth in inter-continental trade in manufactured goods. The effects of these global trends are evident in Croatia as well. Since 2010, container traffic through Brajdica terminal has grown faster than the global average and faster than growth at several regional ports – except for the primary competitor port at Koper, Slovenia. Intermodal transport connectivity (esp. railways) at the port of Koper is a key advantage over container shipment at the port of Rijeka. Enhancements to the rail-port interface and adjoining railways corridor from Rijeka can help to address this. A key consideration for many countries, including Croatia, is the modal structure of container transport as this impacts emission, road safety, maintenance costs, congestion, and overall logistics efficiency. Policies aimed at reducing the share of road freight transport in favor of other modes (esp. railways and / or waterways) are generally considered good practice.

Figure 1 Global trends in container traffic (incl. Croatia and nearby countries)



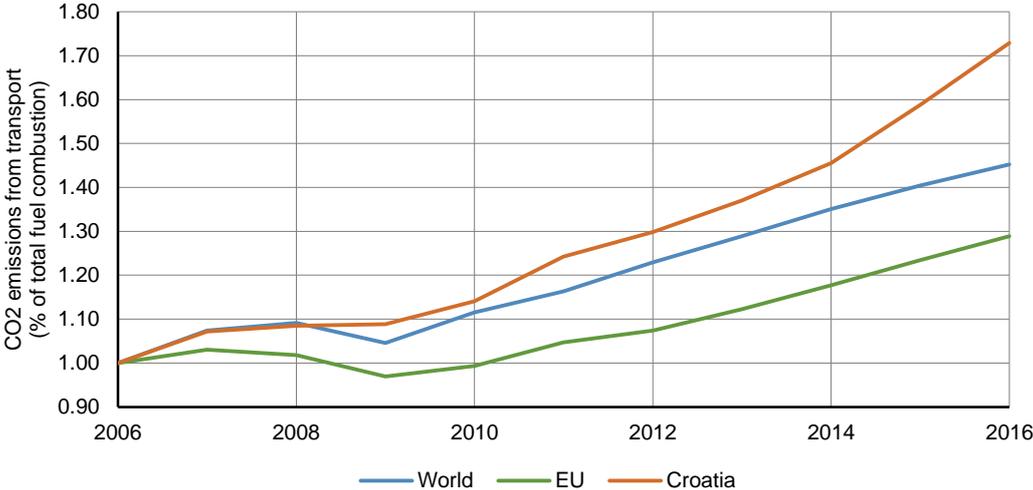
Source: World Bank analysis of United Nations Conference on Trade and Development (UNCTAD) data

2.2 Global trends in passenger movement

7. *Globally, the movement of people has also increased with demands for passenger transport increasing accordingly.* Increasing passenger transport use reflects development and increasing access to international transport in emerging markets (e.g. China) as well as increased travel in many established markets (e.g. North America). For example, between 2006 and 2016 international tourism arrivals globally grew by 45% overall and 29% within the European Union. The growth in tourism arrivals has been particularly noteworthy for Croatia as a key destination country. Between 2006 and

2016 international tourism arrivals to Croatia grew by 73% - far more than the average for the World and the European Union as a whole. Growth in international tourism arrivals has impacted several passenger modes of transport in Croatia including aviation and road-based travel by private cars and buses (and to a lesser extent railways). However, the seasonality of demand for tourism also creates volatility that can challenge the year-round viability of infrastructure needed to accommodate peak periods.

Figure 2 Increase in international tourism arrivals (indexed, 2006=1.00)



Source: World Development Indicators

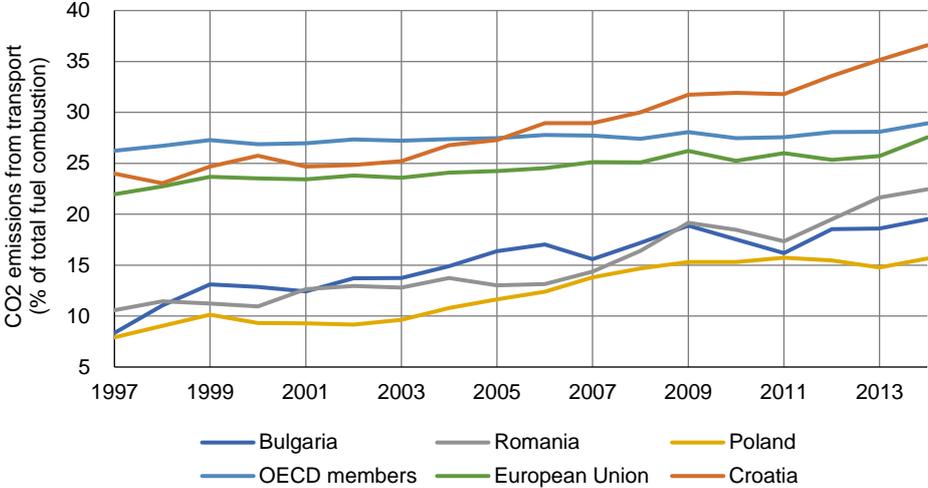
2.3 The global need for greener transport

8. Transport contributes a large and rising share of global emissions and must become greener if climate objectives are to be met – Croatia will need to do its part. As of 2015, transport represented approximately 8 gigatonnes of all global greenhouse gas (GHG) emissions which was roughly 23% of the estimated global total from energy-related sources. Achieving Paris Agreement objectives implies the need for significant reductions. Indicative targets for the transport sector as whole of 2-4 gigatonnes of GHG emissions by 2050 and net-zero emissions shortly thereafter. Within transport, road, rail, inland waterways, coastal shipping and domestic aviation account for approximately 82% of total GHG emissions with road sector emissions alone accounting for roughly 90% of all emissions from this subset.¹ On account of this, many efforts to reduce transport sector emission focus on modal shift from roads to railways, waterways, public transport, etc. At present, the emissions contribution of Croatia’s transport sector appears significantly greater than recent accession countries and the overall average for Europe when judged on the basis of total emissions from fuel combustion. In part, this may reflect the developed state of Croatia’s road network as well as the role that hydropower plays in Croatia’s energy generation mix which reduces fuel consumption outside of the transport sector. Regardless, there is a need for Croatia’s transport sector to improve upon its emissions performance and move closer in-line

¹ International Transport Forum “Transport Outlook 2017”, OECD Publishing, Paris

with EU averages or best practice. The primary mechanism by which Croatia can achieve emissions reduction in the near and medium-term future is to shift transport away from road-based modes.

Figure 3 Croatia’s transport sector accounts for >1/3rd of emissions from fuel



Source: World Development Indicators

2.4 Regional push for reintegration of transport networks

9. The new “Treaty Establishing the Transport Community” between the European Union and the Western Balkans is a potential game changer for transport in Southeast and Central Europe. A defining feature of transport networks in Central and Southeast Europe is their legacy as components of formerly larger transport networks (e.g. the former Austro-Hungarian Empire, and / or the Former Yugoslavia). Present day borders have in many respects created “unnatural” impediments to these former networks. However, the recent signing of the “Treaty establishing the Transport Community” in 2017 offers a critical tool for reintegration of transport in the sub-region. Treaty terms effectively apply some of the most critical transport sector elements of the EU acquis throughout the Western Balkans. In the case of railways, this includes open and non-discriminatory access to infrastructure for both passenger and freight operations. In the case of roads, inland waterways transport, and maritime transport, this means convergence on operating standards and regulations that apply to shippers. In addition, the treaty envisages extensive customs cooperation and facilitation of border crossings for freight and passengers. The potential impact of these changes on Croatia’s transport sector is significant given that Croatia shares borders with three of the six Western Balkans signatories to the treaty. In the longer-term future, there is also the prospect of EU accession of Croatia’s regional neighbors. For example, Serbia was granted EU candidate status in March of 2012. In February 2016 Bosnia and Herzegovina submitted its application for EU membership. In April 2018, the European Commission recommended that the European Council decide to open negotiations for EU accession with the Former Yugoslav Republic of Macedonia. The medium and long-term trends implied by both the new Treaty and the prospect of EU enlargement suggests that Croatia’s transport networks will increasingly be integrated with international freight and passenger flows.

3 Overview of developments in Croatia

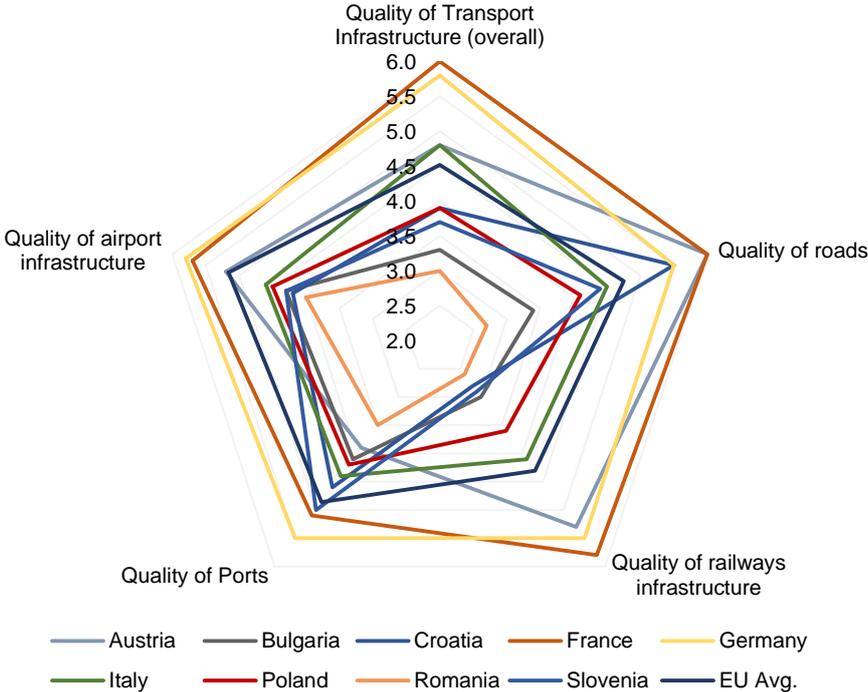
3.1 Overarching context for transport across Strategic Pillars

10. ***Croatia's economic structure has changed and changed the market for transport services, but many elements of transport networks are configured for the past.*** In 1958 agriculture accounted for an estimated 29.4% of Croatia's GDP. In contrast, industry (including construction) and manufacturing accounted for a combined 1/3 of GDP. Tourism accounted for 4.1% of the GDP at the time. By 1980, Croatia had industrialized, and the share of agriculture had shrunk to 10.8% of GDP while industry, manufacturing, and construction accounted for 46%. Tourism remained a minor contributor at 4.0% of GDP.² At the time of independence from the Former Yugoslavia in the early 1990s, Croatia has already begun a process of deindustrialization. At present, the Croatian economy is services focused (71% of GDP). Within that category, international tourism receipts total approximately US\$ 9.8 billion or the equivalent of about 18% of Croatia's GDP. These changes have had a significant impact on markets for transport. Whereas the economy of Croatia's past was comprised of freight intensive activities, its economy of the present is focused on services and the movement of people into, out of, and within Croatia. The structure of Croatia's present economy suggests that passenger services are an increasingly critical element of the transport sector's ability to support growth and economic development.

11. ***Croatia's road network has become one of the best in the world whereas other modes have lagged behind - this makes it difficult to shift passengers and freight to greener and safer alternatives.*** There are imbalances between modes with respect to quality, cost, and speed that affect modal split across Croatia's transport sector— particularly in the case of passenger and freight related services. Most notably, the quality of Croatia's road network is among the world's best and was ranked 19th out of 137 countries surveyed in the World Economic Forum's 2017-2018 Global Competitiveness Report. The quality of Croatia's railways network ranks much lower (ranked 70th out of 101 countries). Croatia's airports also fare poorly and were ranked 74th out of 137 countries considered. This may stem from the fact that Croatia's Airport authorities are functionally and organizationally independent from civil aviation authorities. Fragmentation forgoes opportunities for centralized management of Croatia's air transport infrastructure and the development of an integrated development programs that aim at shaping demand across the airports network. This increases the cost and inconvenience of air travel in Croatia particularly where a passenger's journey may not require a stop and connection in Zagreb.

² Družić, V. Čavrak: Funkcija prometa u hrvatskom gospodarstvu

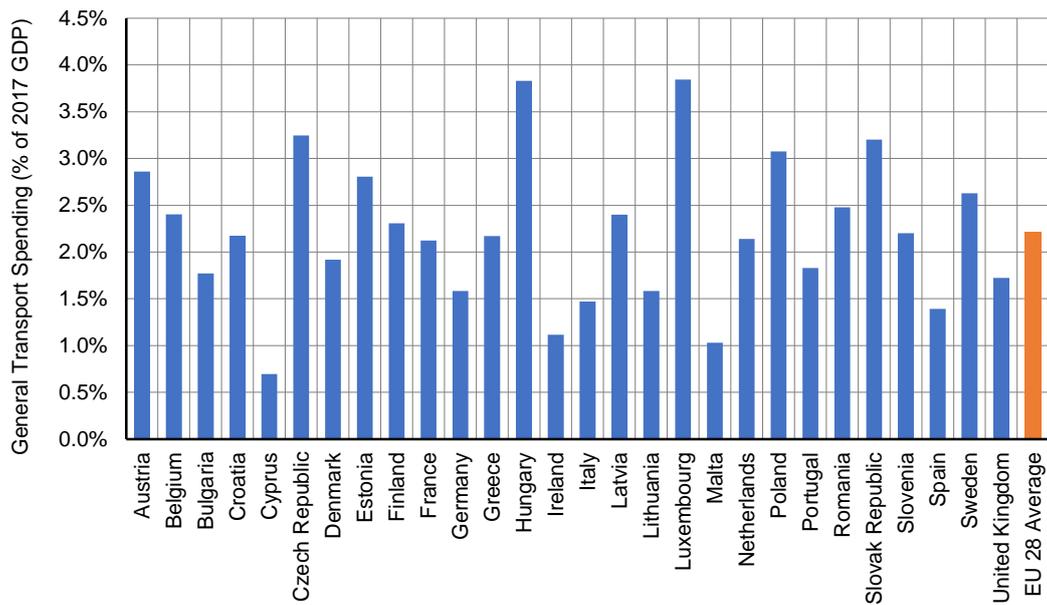
Figure 4 World Competitiveness Report Scores – Croatia and other EU members



Source: World Economic Outlook – World Competitiveness Report 2017-2018

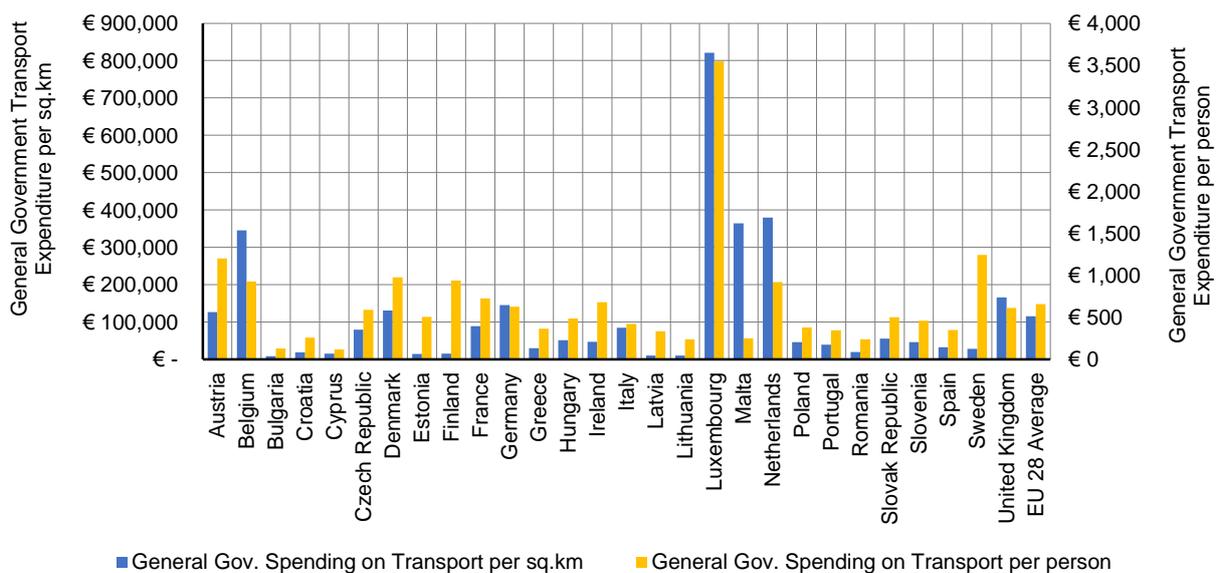
12. Croatia's overall level of spending on transport is near the average for EU member states relative to GDP but low relative to surface area, and population. In 2017 Croatia spend approximately 2.7% of GDP on transport which was near the EU28 average level of spending per member state (2.2% of GDP). However, Croatia’s level of spending relative to population and land area both below the EU average and near the lowest in the EU. Deeper analysis also suggest that relative spending varies across sectors with the most pronounced differences in the railways sector. Specifically, between 2011 and 2016, EU member states invested EUR 110,349 per km of railway network infrastructure whereas Croatia invested EUR 23,065 (4.7 times less per km). As a fraction of GDP over this period, Croatia invested an average of .21% of GDP per year in railways infrastructure whereas EU member states on average invested .29% of GDP per year. The trend of railways infrastructure investment in Croatia has been downward with on both a per km basis and as a fraction of GDP since 2014 when pre-accession investment programs peaked.

Figure 5 Transport spending relative to GDP (Croatia and EU members in 2017)



Source: World Bank analysis of Eurostat data

Figure 6 Transport Spending by Surface Area and Population (2017)



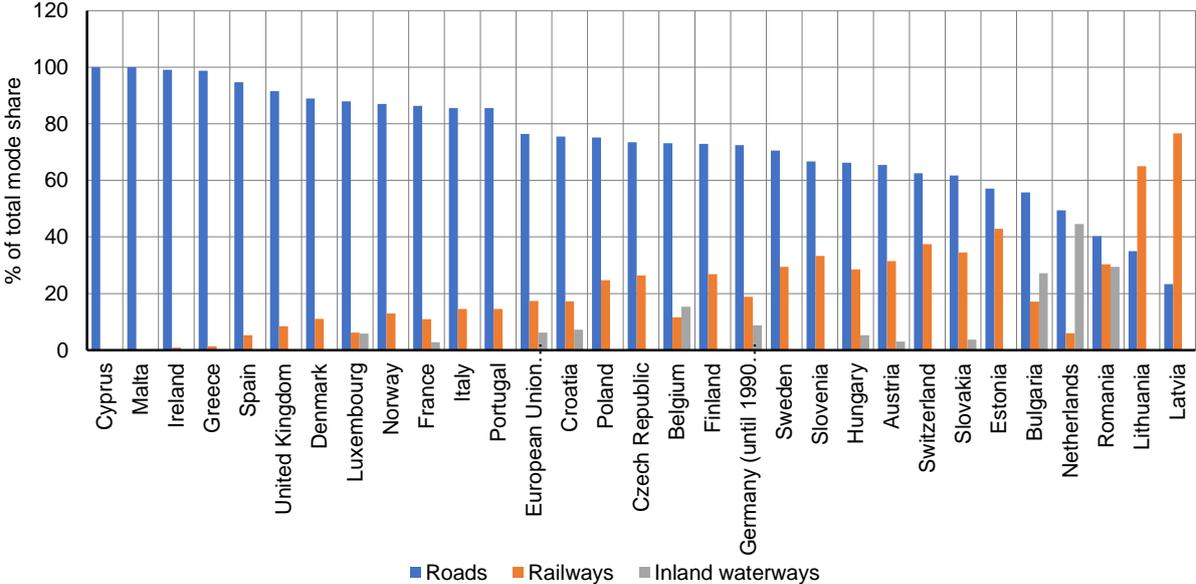
Source: World Bank analysis of Eurostat data on transport spending and World Development Indicator data on surface area

3.2 Developments within and between modes of transport

13. Disparities between the road network and other modes are evident in the pattern of transport demand in Croatia. Roads are the predominant mode of transport in Croatia. This is not uncommon for a European Union member state. However, when viewed relative to European Union peers, Croatia stands out for two reasons: (i) the modal share of passenger transport moving via roads is high relative to the EU average; and (ii) Croatia's share of railways freight is near the EU average despite lagging

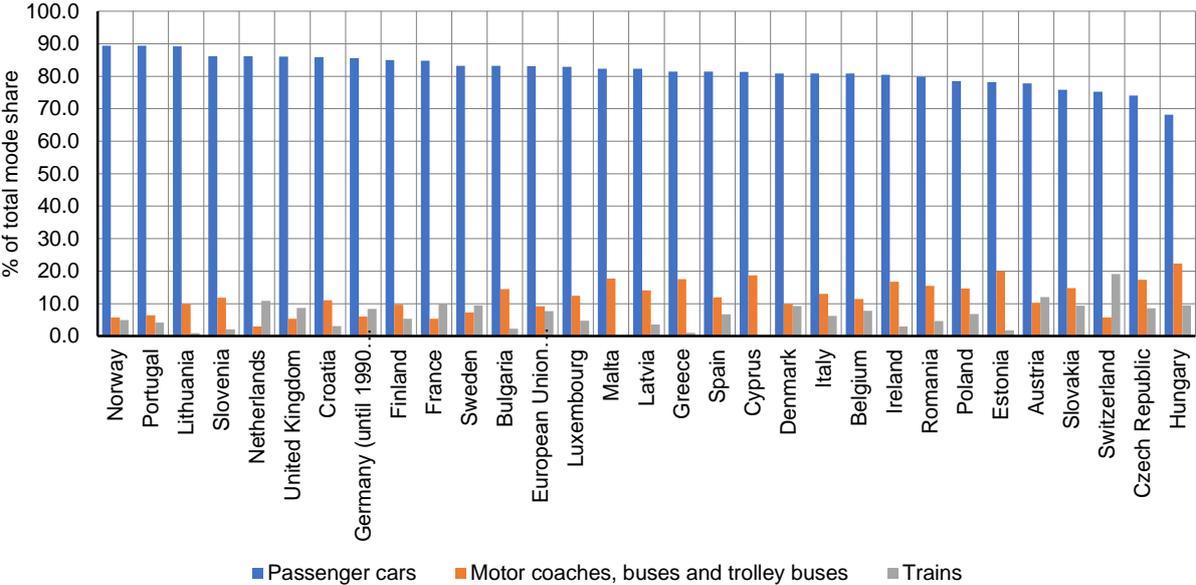
railways infrastructure. The reasons for this likely include the freight-orientation of Croatia’s legacy railways infrastructure and current operations (which currently also result in high costs). The market for railways services has changed, in parallel with the structure of Croatia’s economy which will likely require a reorientation of the railways towards passenger services. While this may eventually enable railways to become more competitive relative to roads, it is unknown whether a similar opportunity exists for inland waterways transport due to the extremely small scale of current waterways traffic. In the whole of 2017 inland waterways transport in Croatia accounted for 574,236 tonnes of freight movement. To put this in perspective, this was equivalent the amount of freight that moved along Croatia’s road network in about 4 average days of that same year.

Figure 7 Road transport in Croatia resembles the EU average



Source: Eurostat

Figure 8 Croatia’s roads dominate the market for passenger transport

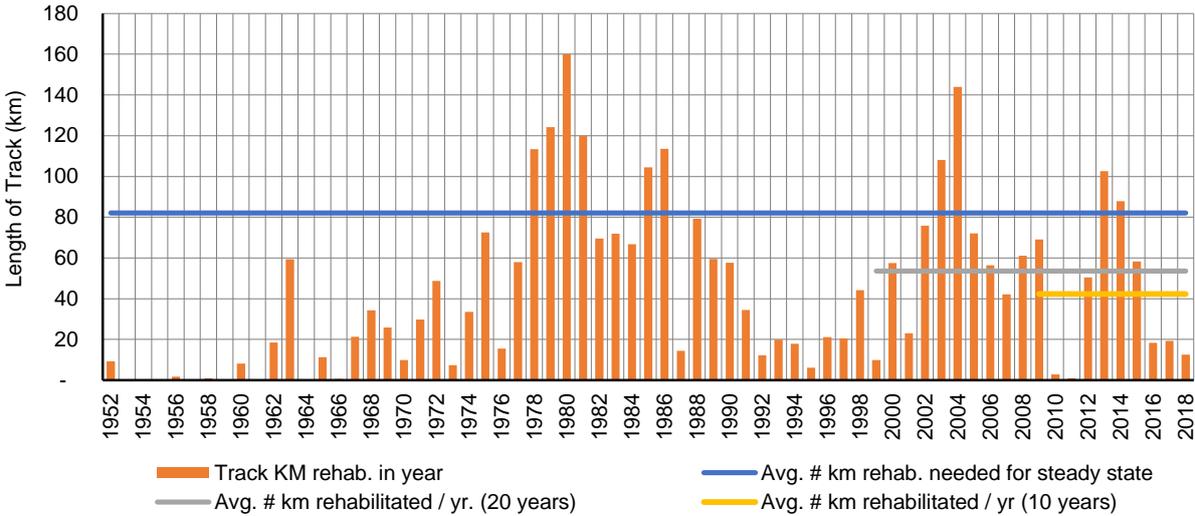


Source: Eurostat

14. The defining features of Croatia’s current railway network is that it is old and slow and HZI’s capital program has not been able to change that. This reduces the attractiveness of rail alternatives.

As of 2018, the average age of a kilometer of railway track in Croatia was 27.2 years. Approximately 58% of railway track-kilometers predate Croatia’s independence in 1991. Approximately 30% of track kilometers date from the presidency of Josip Broz Tito. It is also important to note that the profile of historic investment in Croatia’s railway infrastructure has been volatile with peaks in the early 1980’s and early 2000s. Only about 10% of Croatia’s network has been rehabilitated since EU accession. Since 2013, the trajectory of network renewal has been downward from the last peak in 2013. It is also important to note that the “average” pace of rehabilitation appears to be lagging what is necessary to catch up. Assuming that the average “life” of track infrastructure is 35 years between major renewals, the average number of track kilometers rehabilitated in a given year should be approximately 82 kilometers. Over the last 20 years, HZI has delivered on average 54 kilometers per year (75% of the estimated target for a steady state scenario). Over the last ten years, HZI has delivered on average 42 km of rehabilitated track per year (51% of the estimated need for a steady state scenario). This suggest that the sustainability of Croatia’s network depends on either (i) increasing the scale of HZIs most recent historic capital program by at least two fold; or (ii) shrinking the scale of Croatia’s network by at least 50% so that it matches HZI’s demonstrated delivery capabilities for track renewal; or (iii) at least doubling the efficiency of delivery so HZIs capital program so that the outputs delivered per year can significantly increase. Combinations of these solutions would also likely be mutually reinforcing.

Figure 9 Dating from another era and not catching up fast enough



Source: World Bank analysis of HZI data

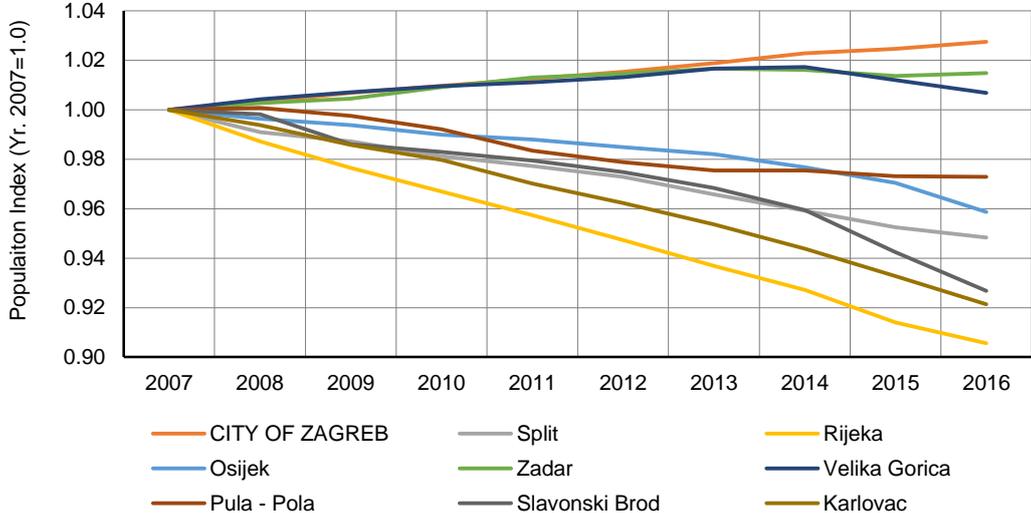
15. State owned enterprises in the roads sector have made progress to consolidate finances but implementation of key decisions is needed for SOEs to become fully independent and efficient.

State Owned Enterprises in the roads sector face operational and financial challenges due to: (i) over-investment in the network; (ii) weak governance; (iii) high operating costs; (iv) large debt stock; (v) short tenor of existing loans; (vi) currency risk and (vii) insufficient credit strength to access the loan market for long tenors on a stand-alone basis. Between 1997 and 2015 *Croatian Motorways* (HAC), *Autocesta Rijeka - Zagreb* (ARZ), and *Autocesta Zagreb* and *Croatian Roads* (HC) – i.e. the Road Sector SOEs) developed their network using some 72 commercial and International Financial Institution (IFI) loans, resulting in outstanding debts of about EUR 5.2 billion, part of which are now being refinanced and rescheduled with support from the World Bank-supported Modernization and Restructuring of the Road Sector project. The Letter of Sector Policy adopted by the Government in March of 2017 sets out

key reforms and lays out implementation plans for actions to achieve them. To ensure that the sector contributes to the economy while being financially sustainable, operational improvements are needed in the following key areas: (i) sector governance, (ii) sector investment planning, financing and implementation and (iii) companies' governance and operations. Key actions that remain to be done include the choice of the future tolling system for the motorways, the improvement of maintenance and contracting methods for motorways and state roads, the establishment of an integrated planning and asset management system and to reduce motorway operational costs further (by about a third to reach European best practices). On the financial side, it includes finalizing the optimization of several outstanding loans, which should be completed within two years.

16. Croatia's cities have seen divergent trends in growth and development which requires different strategies on urban transport. Croatia is less urbanized than the overall average for EU countries. There are only 9 urban areas with populations above 50,000 people (several of which are suburbs of Zagreb). The population of Zagreb City (803,000) and its surrounding county (313,000) represent a medium sized urban agglomeration by international standards. Except for Zagreb and its surrounding suburbs, the majority of urban areas in Croatia have experienced population decline prior to and after EU accession. The scale of Croatia's urban areas and trends in their development implies that urban transport solutions need to reflect pragmatic consideration for the scale and density of demand that will affect the financial and economic viability of services. In larger cities such as Zagreb or Split population densities are sufficient to support suburban rail services considering the presence of existing infrastructure. In other Croatian cities, buses, trams, and non-motorized transport are likely to be the most viable forms of urban transport. Across Croatia's cities there is a need to better understand the factors that affect mobility across disaggregated demographic segments (women, men, young, old, wealthy, poor, etc.) in order to better target transport solutions.

Figure 10 Divergent population trends in Zagreb and surrounding areas

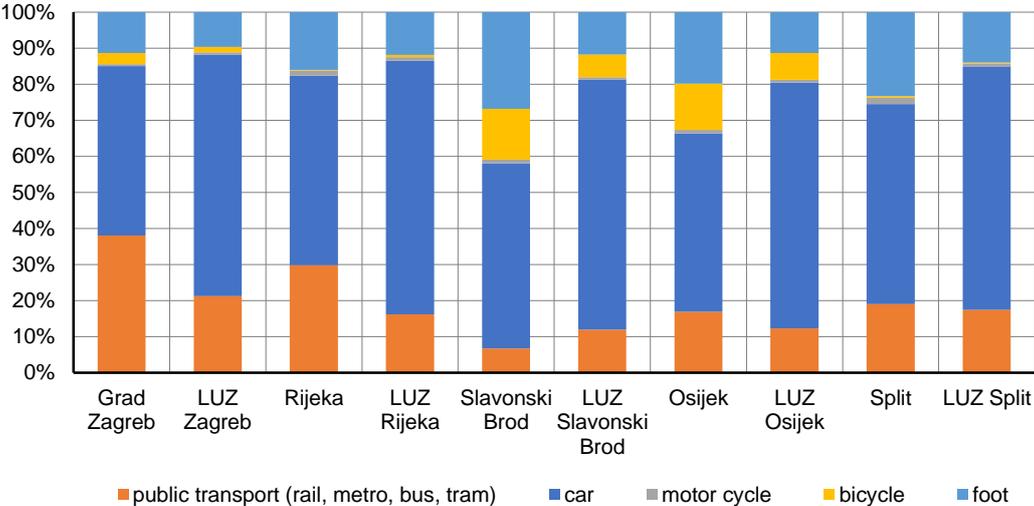


Source: World Bank analysis of Croatia Bureau of Statistics data

17. Transport in Croatia's cities show high reliance on private automobiles which results in negative externalities (e.g. pollution, congestion, and impacts on land use). Available data on modal split suggests that 51% of average work trips in Zagreb are by private cars. This same figure is 61% in Split

and 57% in Rijeka – all of which represent relatively high reliance on private cars.³ Paradoxically, Zagreb, Rijeka also show relatively high modal share of public transport at 41%, 32%, and respectively. For comparison, the mode share of public transport in Vienna, Austria is approximately 39%. The explanation for this paradox is that walking and cycling appears to lag in Croatia’s largest cities relative to international peers. Walking and cycling is higher for cities of similar size such as: Oslo (37%); Lyon (36%); Belgrade (25%); Vienna (34%); Budapest (20%). A key challenge is to enhance the attractiveness of walking and cycling in Croatia’s cities through interventions in physical infrastructure as well as integration between modes than can facilitate integrated trip making with lower use of private cars. Expanding the supply of suburban rail services in Zagreb and Split and enhancing their integration with non-motorized transport modes and public transport (bus and tram) offer an opportunity to demonstrate the effectiveness of such a model that can compete with passenger cars.

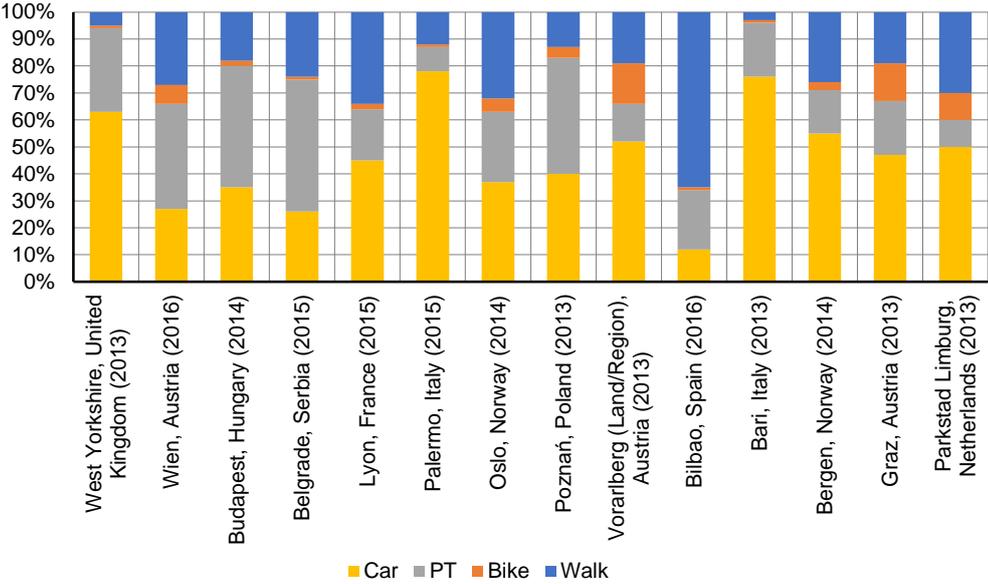
Figure 11 Mode split for travel to work in selected cities and LUZs (2014)



Source: Croatia Bureau of Statistics

³ Croatia Bureau of Statistics

Figure 12 General mode share for trip making – selected cities in and near EU



Source: World Bank analysis of data from the European Platform for Mobility Management

3.3 Croatia and the Trans-European Network – Transport

18. *Croatia's overall indicators for Trans-European Network for Transport (TEN-T) infrastructure show a particularly pronounced gap around railways.* Approximately 60% of Croatia's Core TEN-T roads network is complete vs. only 5% of its Core TEN-T railways network. Croatia's sole Core TEN-T railway corridor runs 550 kilometers from Rijeka through Zagreb and on to the Hungarian border. The average age of track infrastructure along this corridor is 29 years (at the end of useful life) and only 184 kms of the corridor are double tracked. The quality of roads in Croatia ranks in the top third of EU member states. However, the efficiency of train services in Croatia is the worst in the EU and Croatia's score for this indicator is 38% lower than the EU average. While Croatia ranks poorly relative to EU peers on indicators relating to aviation, inland waterways, and seaport services, the absolute magnitude of variance from EU averages is less for these sectors. It is also not clear that inland waterways transport is a development priority relative to Croatia's other transport sector needs at this time considering fiscal constraints and a limited domestic market for inland waterways transport (see section 4.2).

Figure 13 EU Transport Scorecard – Croatia

Indicator	EU avg. Score	Croatia score	Croatia rank (1=best in EU)
Efficiency of train services	4.33	2.66	26 of 26th
Efficiency of seaport services	5.00	4.47	19 of 23
Efficiency of air transport services	5.19	4.60	24 of 28
Quality of roads	4.78	5.49	8 out of 28
Completion of TEN-T Road Core Network	77%	60%	19 of 28
Completion of TEN-T Conventional Rail Core Network	60%	5%	23 of 26
Completion of TEN-T Inland Waterways Core Network	88%	33%	18 of 19
Timeliness of shipments	3.88	3.59	24 of 28

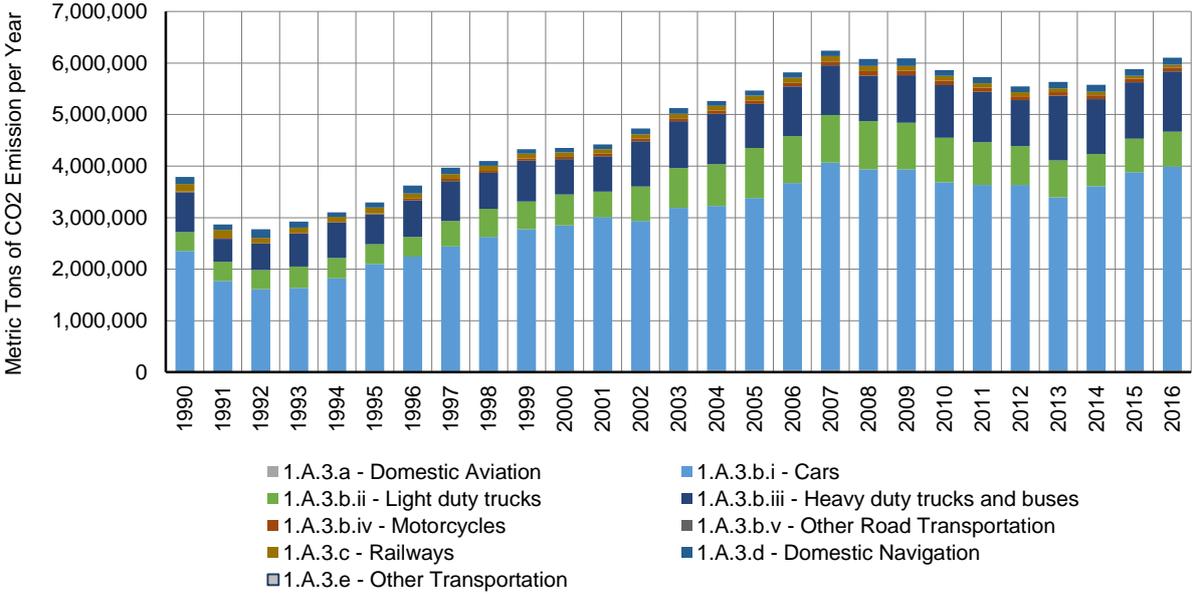
Source: Summary of EU Transport Scorecard for Croatia, Transport Infrastructure Indicators

3.4 Trends in Croatia's emissions from transport

19. ***“Greening” transport in Croatia requires solutions for high dependence on cars and heavy trucks.***

An estimated 96% of Croatia's transport sector CO₂ emissions are from road transport. The single largest source of road sector emissions is cars (65% of Croatia's total) followed by heavy trucks and buses (19% of Croatia's total emissions). In accordance with Croatia's National Transport Development Strategy, modal shift should remain a key policy priority for reducing transport sector emissions. However, Croatia should also consider interventions to avoid and improve emissions under an integrated “avoid-shift-improve” strategy for transport emissions reduction. Measures to avoid emissions could include Transit-Oriented Development interventions and integrated land use and transport planning that avoids the need for making motorized trips entirely. Similarly, taxation policies, tolling, and registration fees relating to road vehicles could also offer an opportunity for improving the emissions characteristics of motorized trips through emissions-dependent charging schemes. As electric mobility technologies mature, Croatia could also consider increased emphasis on domestic uptake of electric vehicles in parallel with efforts to further expand the use of renewable energy resources.

Figure 14 Road transport dominates transport sector emissions in Croatia



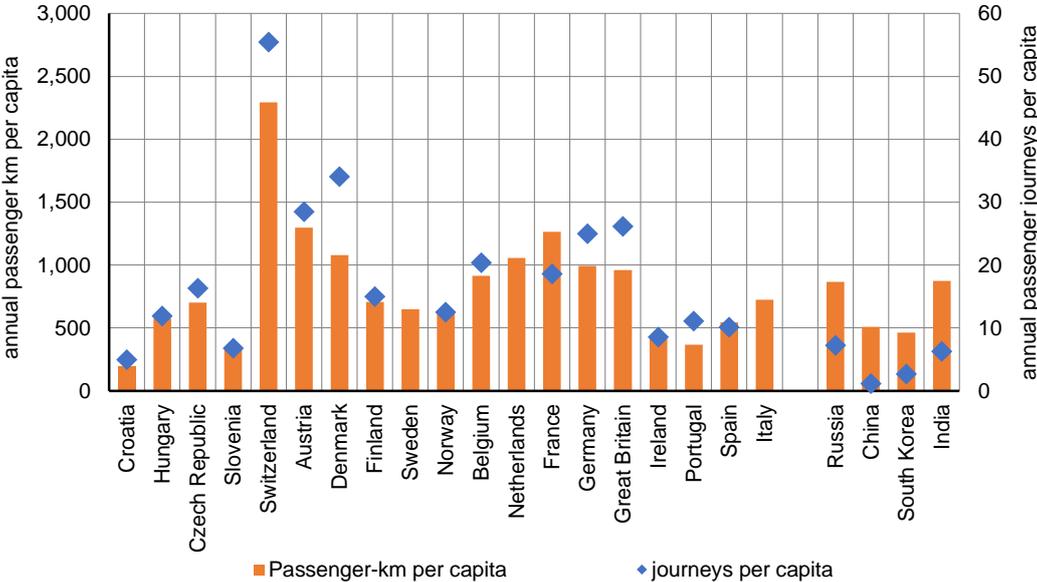
Source: World Bank analysis of UNFCCC data

4 Assessment of the main development challenges & opportunities

4.1 Pillar 1: facilitating movement of people to support services-led growth

20. **Strengthening services in areas with demand is critical to increasing railways passenger traffic – suburban transport in Zagreb and Split offer the foremost opportunities.** Passenger rail use in Croatia is very low by European standards and falling. Per capita, Croatians make less than half as many rail journeys per year than people in Portugal, 6 times fewer than people in Austria. However, suburban rail services in Zagreb constitute the highest levels of rail passenger transport demand in Croatia. While demand in Split is lower, existing track infrastructure has already been recently upgraded. In addition, the geographical configuration of suburban development in Split (which parallels the arc formed by the railway line and nearby bay) provides an ideal catchment for railway services. In both Zagreb and Split suburban rail services are constrained by limited EMU and DMU fleets that limits train frequency. In Zagreb, single track lines and higher infrastructure use for freight and regional trains may require additional investments in static or dynamic passing loops in order to facilitate higher frequency of service.

Figure 15 Croatia’s low levels of passenger demand

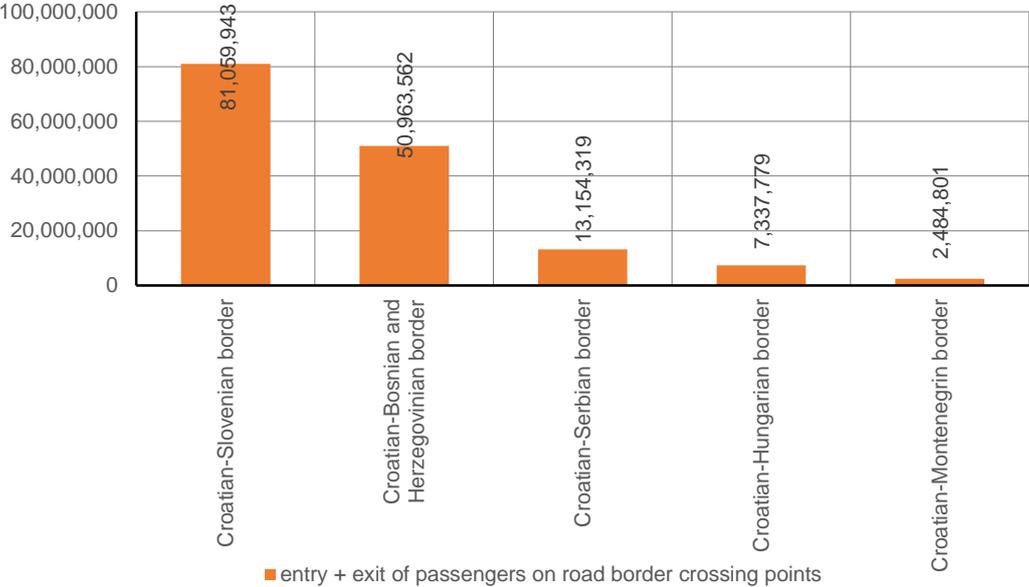


Source: Union Internationale des Chemins de fer (UIC) data synopsis

21. **Development of international railways passenger traffic is an opportunity for growth that can be captured by improving supply of rail services.** Currently, about 99% of rail passenger journeys in Croatia are domestic. However, the proximity of key cities in neighboring countries (e.g. Vienna 370 km, Belgrade, c. 400 km from Zagreb; Ljubljana, 150 km; Graz, 200 km) mean that faster and more frequent passenger rail services could potentially attract demand from aviation and road-based modes. Croatia’s planned 2020 entry into the Schengen Zone will also simplify cross border travel to EU neighbors. There are significant passenger movements across Croatia’s borders (including passenger

buses) that suggest key routes that the railways can target for expanding the passenger market. In 2017, 155 million people crossed Croatia’s borders by road-based modes (cars, buses, trucks, and all other road vehicles). The road border crossing points with Slovenia and Bosnia and Herzegovina were the most active in 2017 and accounted for 52% and 33% respectively of all passengers. In aggregate, more than 2/3rds of passengers who made road crossings were foreign although this varies considerably by border. For example, roughly ¾ of passengers who made road crossings at the Croatian-Slovenian border were foreign whereas crossings at the border with Bosnia and Herzegovina were evenly split between Croatians and foreigners. Croatia Bureau of Statistics figures also show 653,672 buses crossing Croatia’s borders with the Slovenian, Bosnian and Herzegovinian and Serbian borders accounting for 39%, 40%, and 12% of passenger crossing by bus respectively. This is noteworthy as it shows an existing market for shared international transport that may overlap most directly with potential international railways passenger customers. A key challenge is that the current market for international railways passenger traffic is not indicative of underlying market potential because the quality of service is so low at the present time. Enhanced timetables, rolling stock, and line speeds combined would serve to change this and are proposed as a priority intervention under the National Development Strategy.

Figure 16 Road passenger movements across Croatia’s borders



Source: World Bank Analysis of Croatia Bureau of Statistics Data

22. Despite developed infrastructure, Croatia’s roads are dangerous – ongoing efforts to address this should continue as a matter of national priority. The safety of Croatia’s roads imperils road users, does not match the infrastructure quality of the road network, and lags EU peers. In 2017 alone there were a reported 10,939 road accidents in Croatia that resulted in 14,939 accident related casualties (injured + killed). Amongst this total, there were 331 fatalities.⁴ The rate of road-related fatalities per 100,000 people in Croatia is more than 63% higher than the average for EU 28 countries.⁵ The Ministry of Sea, Transport and Infrastructure (MSTI) has sought to address this under a four-year action plan that was identified in its 2017 Letter of Sector Policy and complementary interventions that have benefited from co-financing under the World Bank-supported “*Modernization and Restructuring of the Road Sector*”

⁴ OECD International Transport Forum road safety statistics

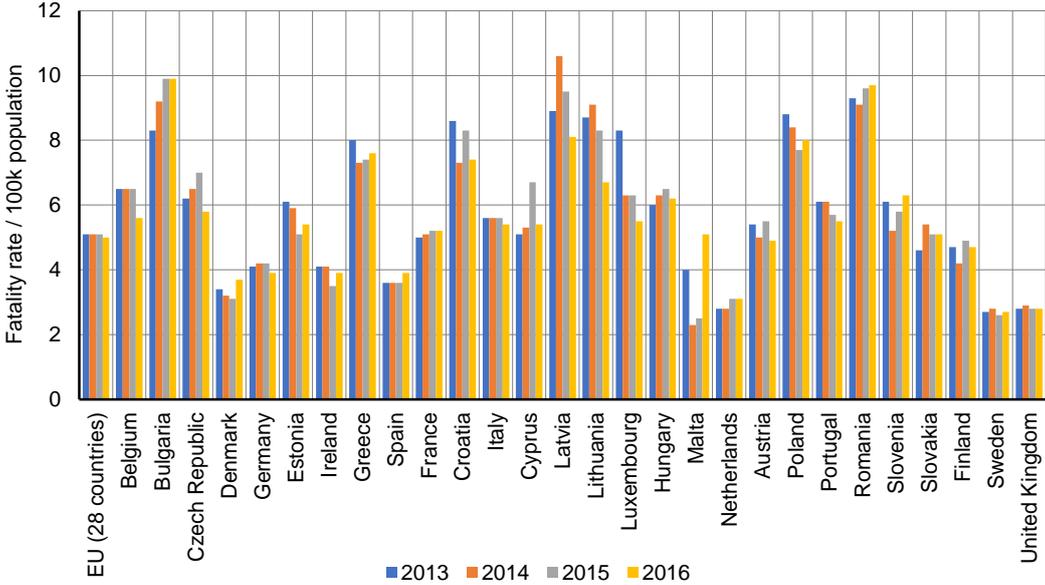
⁵ Eurostat

(MARS) Project. Specific interventions include: (i) improvements in safety barriers; (ii) site specific infrastructure interventions at high-accident locations; (iii) investments in Intelligent Transport Service (ITS); (iv) introduction of weigh-in-motion stations to control for overloading; and (v) measures to increase compliance with the EU's Directives on road safety (2008/96) and tunnel safety (2004/54). These measures, along with the areas of action identified in the National Road Safety Program of the Republic of Croatia (2011-2020) are heartening but have not proven effective. As the current national program comes to an end, there is an opportunity for Croatia to develop a successor program that addresses gaps identified by the European Commission⁶, the World Bank's team, and others and to implement this under the aegis of the National Development Strategy. Key enhancements should relate to addressing the following areas of priority:

- *Enforcement gaps, need for behavior change, and gaps in road user education:* rates of seatbelt, helmet, and child-restraint use in Croatia are lower than the EU average. Enforcement is typically applied during pre-announced campaigns and there is lack of evidence that systematic spot checks or application of penalties occurs for alcohol use by drivers. The over-representation of fatal single-vehicle accidents in Croatia suggests a high incidence of excessive speeds. There is also no road safety education program in place at schools which could help educate the population of new drivers;
- *Seasonality and locality factors that contribute to poor safety:* There is high seasonal variation of road traffic in Croatia especially near coastal areas and along access links to those areas. There is a correspondingly high seasonality in accident rates. Motorcycle crashes are over-represented compared to the European averages. Together, these trends illustrate the importance of targeting holiday makers in education campaigns; and
- *Institutional ownership and coordination:* Croatia is implementing the current National Road Safety program under an inter-ministerial committee coordinated by the Ministry of Interior (MUP). Despite well-defined overall targets, there is less than optimal accountability for intermediate-level objectives and specific interventions. A successor program could benefit from assigning specific institutional accountability for interventions while matching those assignments with corresponding budget allocations.

⁶ "Road Safety in the European Union – Trends, statistics and main challenges" (April 2018); and European Commission, Road Safety Country Overview - Croatia, European Commission, Directorate General for Transport (September 2016).

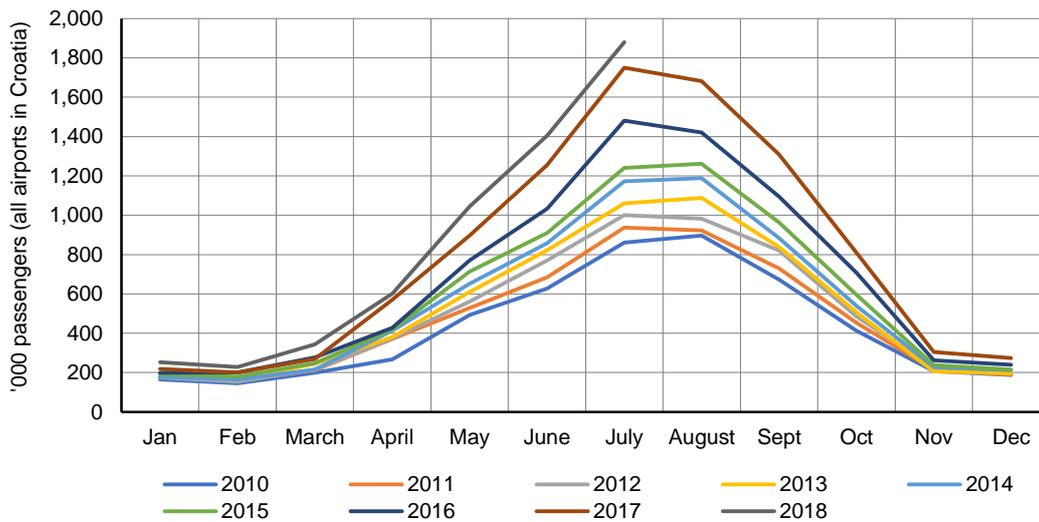
Figure 17 Developed roads that remain unsafe



Source: Eurostat

23. Croatia’s airports face a twin challenge of rapidly increasing demand and seasonal volatility – integrated planning across airports is essential for success. This creates a challenge to have sufficient capacity at the right times of year while also using that capacity efficiently at other times of year. Tourism plays significant role in Croatian economy, and demand in aviation is above all linked to the tourism sector. Many of Croatia’s airports have purely seasonal character with leisure and tourism-oriented development strategies, which represents connectivity issue in the national air transport network that centers around Zagreb. In 2017 alone, demand for air passenger transport in Croatia grew by 17%. Annual demand for air passenger transport in Croatia during 2017 was 60% greater that it was in 2012. It is important to note that almost 85% of the entire airport passenger traffic takes place at the three largest airports, Zagreb (36%), Split (25%) and Dubrovnik (24%), and there is a need to identify effective development strategies to increase capacity utilization of other airports in the network. There may be a need for Croatia’s aviation sector to plan for capacity increase and / or greater distribution of demand across national airports if these trends continue into the future. Presently, however airport capacity in Croatia is not a binding constraint and additional airport development remains a secondary priority given adequate capacity at secondary airports.

Figure 18 Growing and highly seasonal aviation demand



Source: World Bank Analysis of data from CAPA - Centre for Aviation

4.2 Pillar 2: “enhanced freight and logistics for competitiveness”

24. Croatia’s geographical location provides access to major maritime links but making effective use of port facilities requires targeting niche markets and develop strategies that consider factors beyond port facilities. Croatia’s coastline constitutes over half of the east Adriatic Sea and has historically been the site of important seaports linked to land corridors serving central and eastern Europe. The seaport of Rijeka is included in the TEN-T core (first-level) network, whereas other ports of national importance – Ploče, Split, Šibenik, Zadar, Dubrovnik and Pula – belong to the TEN-T comprehensive (second-level) network. All mentioned sea ports are managed by state-owned Port Authorities (Lučke Uprave) but the majority are operated by at least one commercial concessionaire. Smaller ports are managed at the county or local-authority level. The characteristics of Croatia’s seaports are unique, and they serve different target markets. The approaches adopted for developing port traffic should be similarly nuanced as described below:

- **International trade and transit:** Rijeka is currently Croatia’s dominant international port and is likely to remain so following recent upgrades to increase container capacity. Rail connections to the two central locations of Rijeka and Susak are currently under improvement, whereas an expressway link to the latter (Brajdica terminal) is in operation and a similar one to Zagreb terminal is planned for construction. Rijeka is the deepest port in the Adriatic (25 meters) and is considered as having a large potential for transshipment. As regards passenger transport, Rijeka’s role is diminishing: current annual level of passenger traffic is at 150,000, compared to over 200,000 in the previous decade whereas tonnage in freight and container traffic has increased. Ongoing efforts to develop port connectivity (esp. with railways as described below) are likely to offer the most immediate development benefits for these ports.
- **Regional traffic:** Ploče is the main cargo gateway for Bosnia-Herzegovina (90% of the freight traffic is transit) and is considered as having a good potential for transshipment. It has eight terminals for different types of cargo (primarily bulk and also general, wood, container and liquid). It lies at the extremity of the former corridor Vc which includes an existing rail link to Sarajevo and Osijek. Its infrastructure and road connection to Croatia’s A1 motorway was upgraded as part of World Bank-

supported investments. Measures beyond the port of Ploče to enhance regional integration with Bosnia-Herzegovina under the newly signed Treaty Establishing the Transport community are likely to offer the most immediate development benefits for this port.

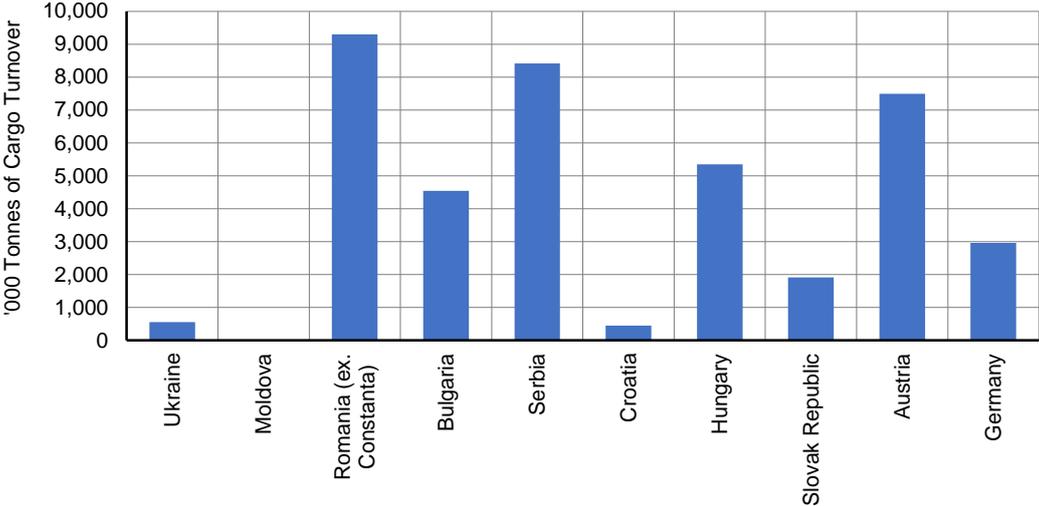
- ***Island connectivity and tourism:*** Split, Šibenik, Zadar, Dubrovnik and Pula are not focused on international freight traffic but on coastal, cruising and other passenger traffic as well as tourism. All (except Dubrovnik) have a rail connection but these are often not used in optimal ways (e.g. Split). Coastal shipping is also performed from/to lesser ports that are essentially ferry landings. Most of the coastal traffic (85%) is performed by state-owned Jadrolinija. The average fleet age for all ship categories exceeds 20 years. Renewal of the fleet and enhanced passenger connections to these ports (e.g. under the proposed Split suburban rail system's development) are likely to offer the most immediate development benefits for these ports and to the communities that depend on passenger connectivity that these ports offer.

25. *Intermodal integration and a lower elevation change inland route for rail transport are the key challenges for increasing throughput at the port of Rijeka:* Rijeka is Croatia's main seaport. It lies at the extremity of the Mediterranean corridor which, through the road and rail links with Zagreb, provides the shortest connection between the Adriatic and countries such as Hungary and Ukraine. Rijeka has evolved from a feeder port for small vessels to a port of call for containers. Its annual throughput has risen from 15,000 Twenty Foot Equivalent Units (TEU) in 2002 to 250,000 TEU in 2017. Container traffic at Rijeka is handled by the Brajdica terminal (operated under concession by Adriatic Gate), whereas the new Zagreb terminal is under construction and also planned for concession. The overall capacity for Rijeka could exceed 750,000 TEU upon its completion. Overall, North Adriatic ports are benefiting from a surge in container transport from Asia to Central European markets. An estimated 2,300 nautical miles are saved by ships calling in Rijeka, Koper and Trieste, compared to Rotterdam and other north west European harbors. There is an opportunity to build on increased container traffic through Rijeka and along the Rijeka-Zagreb railway corridor using improved railways connectivity. In 2017, this corridor accounted for 28.9% of all freight gross tone-km in Croatia. Between accession in 2013 and 2017 gross tone-km on the Zagreb-Rijeka corridor grew by 32%. Growth in tone-km from the Brajdica container terminal to Sušak Pećine (the M604 railway line) increased by 291% between 2013 and 2017. A present, key challenges facing the railways freight leaving from Rijeka are: (i) poor railways integration with the port itself; and (ii) difficulties traversing the segment of Croatia's RH2 corridor between Rijeka and Ogulin where cumulative elevation change requires multiple locomotives, shorter trains, and shunting / train reformation. HZI has investigated a lowland alternative which requires further project preparation. In addition, the tentative alignment that has been identified is not currently included in European Union's defined 5B corridor. Supporting the further development of this project and its funding solution should be included in Croatia's National Development Strategy.

26. *Croatia may be able to get more from Danube and Sava river access than it currently does but a key challenge is to size investments realistically given a limited market.* Croatia accounts for one of the lowest levels of cargo turnover along the Danube River of all countries that belong to the Danube River Commission. For example, in 2016 Bulgaria and Serbia had 10 times and 20 times more cargo turnover respectively than Croatia on the Danube. In part, this reflects Croatia's geographical configuration and access to maritime transport along the Adriatic Sea which provides an alternative for transporting bulk goods. It also reflects underdeveloped inland waterways infrastructure and limited market demand owing to the structure of Croatia's modern services-dominated economy. Currently inland waterway traffic is small. For example, in 2016, Vukovar transshipped (i.e. served as an intermediate point) for 292,000 tonnes of cargo, mostly bulk cargo such as fertilizers, and corn. Similarly, Slavonski Brod on the Sava transshipped roughly 198,000 tonnes in 2016. Navigability along the Sava is lower, ranging from class III to IV along the Croatian-Bosnian border. Dredging works are underway on the Croatian

side of the III-level interval (east of Slavonski Brod: Oprisavci to Slavonski Šamac) but the restoration of navigability to level IV – and thus the potential of inland waterway traffic reaching pre-war levels – will require a trans-national effort including de-mining works. Additional investments to develop Croatia’s waterways network and its intermodal connections could be beneficial but these should also be pragmatically approached with a view to the credible level of demand from producers and consumers of bulk products that may travel along the waterways. At present, development of waterways in Croatia appears to be a secondary priority.

Figure 19 Cargo turnover in 2016 for Danube Commission Member States



Source: Danube Commission 2016 statistics, Moldova data not available

4.3 Pillar 3: “developing high value jobs in transport-related industries”

27. *Croatia can capitalize on the disruption offered by eMobility and the presence of a domestic champion (Rimac Automobili) to develop high-value jobs.* Electric mobility is, at its core, a disruptive transition for the world’s automotive industry. There are elements of electric vehicles that are comparable to conventional vehicles such as interior trim and body paneling. However, drive train components, cooling systems, braking, and the absence of any systems relating to liquid fuel and exhaust make the supply chain around EV production significantly different. Electric vehicles also generally have fewer components (e.g. 20+ parts in an electric motor vs. 200+ parts in a simpler conventional petrol engine). These differences have implications for industry as well as employment which is both a threat and an opportunity for countries depending on their current position in the global supply chain. Croatia has a potential opportunity to capitalize on the business model that Rimac Automobili has developed. Firstly, Rimac has focused on high-value innovation rather than mass production where other countries / firms would have natural advantages. Its electric “hypercars” have demonstrated new levels of performance and cutting-edge technology rather than mass production. The Rimac C_2 for example is rated at 1,914 horsepower can reportedly go from 0 to 100 km/hr in 1.85 seconds, offers a top speed of 412 km/hr; and has a 650 km range on a single charge. This level of performance represents a

remarkable step change in general for automotive capabilities that is unmatched by any other company.⁷ And while going fast is not a new business model for the automotive industry, what Rimac does with its business beyond the C_Two is. Specifically, Rimac acts as an outsourced innovation provider for large Original Equipment Manufacturers in Europe and elsewhere who benefit from its technical capabilities to improve the products that they offer to global markets. This business model aligns with Croatia's potential comparative advantages in the expanding electric mobility sector. Developing a domestic electric mobility program for vehicle use in Croatia may be a secondary development priority for Croatia at the present time. However, Government support to enable an industry cluster that is focused on innovation to develop around Rimac could unlock high value job growth in segment of the global automotive industry that is projected to grow rapidly.

28. *Developing an aircraft Maintenance, Renovation (MRO), and Overhaul Osijek airport is an opportunity for providing high-value, much needed jobs in the Slavonia region.* The global volume of the MRO industry is approximately US\$ 115 billion and is growing at annual rates between 3-4% per year as global aircraft fleets increase. Europe is the second largest sub-market for MRO services behind North America (about 22% of the global total) and is currently experiencing capacity constraints. MRO services are often provided at secondary airports where space and runway capacity are less constrained than they are at major hubs. Osijek airport is geographically positioned between Osijek, Vinkovci, and Vukovar. It offers a 2,500 meter runway which is large enough to accommodate production aircraft that comprise the Airbus, Boeing, Bombardier, and Embraer fleets. A key advantage of Osijek airport is that it is not constrained by topographical features (mountains) or surrounding land use that would be incompatible with the development of MRO industries. These same factors make the Osijek airport's development as a passenger or freight air hub unlikely. However, there is a potential for supporting the development of an aviation industry hub around Osijek that would provide higher-value jobs in the Slavonia region. In particular, the MRO market for aircraft services could offer a starting point for developing such a cluster that may eventually also grow to include aircraft component production or assembly. A program of industry outreach and corresponding interventions to develop workforce skills and complementary facilities around Osijek airport should be considered for inclusion in Croatia's National Development Strategy.

⁷ To put this in perspective, vehicles used in conventional fuel track racing applications generally ranges from 750 – 1,000 horsepower. The fastest production cars that use convention fuel can accelerate from 0 – 100 km/hr in about 2 to 3 seconds.

5 Prioritized policy recommendations

29. ***Operationalize the “Treaty establishing the Transport Community” in 2017 through a combined domestic and foreign policy effort.*** There is an opportunity to drive the Treaty’s implementation forward through a combination of domestic interventions and foreign policy objectives. Domestic interventions should include: (i) targeted capital investment in a specific mode or subset of modes along a corridor on each side of an international border; (ii) simultaneous investment in integration / intramodality with the target corridor to generate inclusive access to the treaty’s benefits (e.g. bus to rail, road or rail to port, inland waterways to rail, etc.); (iii) operational restructuring of service delivery along the redeveloped RH1 and RH2 corridors to align timetables, synchronize customer interfaces, and harmonize pricing of a given transport service; and (iv) operationalization of the Treaty’s terms through streamlined customs at one or more target border points. The tactic behind this proposed approach would be to marry reforms with investments in order to demonstrate a “total corridor modernization” approach that would be both high visible to beneficiaries as well as providing a significant demonstration impact that can be carried forward to future initiatives. One potential target for operationalizing the Treaty could be the Zagreb-Belgrade railway corridor (RH1) that currently appears to underperform relative to its passenger potential. In addition to domestic interventions under the National Development Strategy, Croatia’s foreign policy and role in the European Union (including the upcoming presidency) should be used to encourage complementary efforts in neighboring Countries.

30. ***Strengthen the planning and coordination functions of MSTI and adopt an outcomes-based approach rather than sub-sector focused approach to transport.*** Planning in Croatia’s transport sector has historically been mode and subsector specific (i.e. motorways, railways, ports, aviation, etc.) rather than objective and outcome specific. Opportunities to achieve objectives using complementarity between modes or intermodally have accordingly been missed or poorly coordinated. In the worst instances, planning has been contradictory across modes. Implementation of capital programs has also been disjointed which limits the potential for achieving more complex investment solutions that require coordination between different entities. The foremost example of this has been the development of motorways corridors prior to the renewal of parallel railways lines despite an overall stated policy objective to increase the fraction of freight transport carried by rail. A further example has been the development of Rijeka’s port facilities without concurrent investment in railways connectivity to support the port’s growth. A proposed solution to improving planning and coordination across the sector would be to establish a Department of Strategy and Planning within MSTI through a Ministerial decision and to task that department with owning national programs for each target outcome under the Transport Development Strategy. This department would have a mandate to coordinate the interventions of different departments and companies tasked with implementation. Improving MSTI’s capabilities in this regard is critical to the National Development Strategy’s success.

31. ***Establishing mechanisms for multi-annual funding and investment appraisal under the Ministry of Finance can support the National Development Strategy’s transport objectives.*** Transport investments are generally characterized by long supply chains, multi-year implementation requirements, and the risk of overinvestment relative to actual demand. Croatia’s Ministry of Finance has historically struggled to address challenges that result from these characteristics. Accountability around “value for money” in Croatia’s transport sector has been difficult to manage due to information asymmetries between implementing agencies and the Ministry of Finance. Similarly, annualized funding has constrained implementing institutions charged with managing assets that require long time frames to plan, develop, and maintain. Key policy interventions that Croatia should consider in support of the National Development Strategy’s transport objectives include:

- Developing contractual frameworks for MOF to deploy multi-annual funding commitments with implementing institutions. A foremost priority for such an approach is the program of railways capital investment managed by HZI. One solution that has been used within Europe and elsewhere is to use a contract between MOF and the railways infrastructure manager that commits funding against agreed delivery targets (similar to a Public Service Obligation for service delivery); or
- Establish a national fund for the transport sector within the Ministry of Finance with a dedicated cashflow stream that would not be subject to annual appropriations acts. This fund would include capabilities for investment appraisal against pre-agreed criteria for project viability. One advantage of positioning such a fund under MOF would be the potential to establish “purchaser-provider” relationships with implementing institutions. Internationally, similar structures have proven useful for enhancing the value for money spent on transport while also providing longer term funding stability that benefits implementing institutions. Establishing such a fund would likely require a dedicated legal act.

32. Strengthen the governance and accountability regime in the transport sector (road and rail).

State-Owned Enterprises feature heavily in Croatia’s transport sector. If the Government of Croatia chooses to maintain this policy direction, it would be advisable to enhance the governance and accountability regimes that apply to those Companies. In the first instance, there is a need to provide the Companies with aligned performance objectives and reliable financial resources to enhance the technical discretion afforded to management for seeking efficiencies. In so doing MSTI and MOF would also be better positioned to hold management of SOEs to better account for better spending of public money. There are presently three opportunities for strengthening the governance framework that applies to transport sector SOEs:

- Roads: Signing service agreements between the MSTI and the road sector companies and defining KPIs (Key Performance Indicators) that will enable MSTI to monitor their performance;
- Rail infrastructure: Introduction of a Multi-Annual Infrastructure Contract (MAIC) between MSTI and HZI. This would frame a multi-annual capital program of investment with both defined budget allocation and clear performance targets for delivery of rehabilitated infrastructure; and
- Rail passenger operations: There is currently a Public Service Obligation (PSO) in place between MSTI and HZPP. However, it needs to be fully operationalized and used as a tool for redefining service schedules in line with an overall plan for attracting greater passenger ridership for a given level of railways passenger subsidy funding.
- Railway company boards: The political economy of the railways sector also implies the need for enhancing technical independence of railways Company boards and management teams. Measures that can support this include: (i) selection of professional and independent management boards; (ii) management accountability based on business targets; and (iii) rationalization of non-core assets and subsidiaries under the railway companies. There is also a need to enhance the role of women in governing the companies. At present, there is no female member on the board of HZI, HZPP, or HZC which does not align with good practice in Europe or elsewhere for diversity and inclusion.

33. Use a National Railway Strategy to better govern the investment approach. Investment in Croatia’s railway network is currently characterized by “firefighting” against urgent needs and ad-hoc investment in rehabilitation depending on availability of funding (e.g. EU funds, IFIs or Government’s own funding). The role of a National Railway Strategy would be to prepare a comprehensive framework for investment that would enable a more structured approach. It would aim to define a long-term vision of development of the railway system, determine strategic priorities for investment, and support planning to develop a pipeline of projects accordingly. The National Railway Strategy would also integrate with Croatia’s proposed legal framework and would provide the basis for setting medium term funding

allocations / performance targets under the proposed Multi-Annual Infrastructure Contract (MAIC) with HZI.

34. ***Continued policy priority on road safety is needed to align with EU peers.*** Croatia's road safety performance lags EU peers. Croatia is home to approximately 1.3% of the European Union's road deaths despite having 0.8% of its total population. More specifically, Croatia's rate of road-related fatalities in 2017 (80 per million inhabitants) was well above EU's average and exceeded by only Romania (99) and Bulgaria (96). Drastic improvements are still needed to bring the level of Croatia's road safety up to that of its European peers. At the institutional level, the following major interventions are needed:

- ***Development of a new multi-year National Road Safety Program, as a successor to the 2011-2020 program.*** The new program will need to reflect the EU (DG MOVE) targets and priorities, which are currently under development in consultation with the Member States. It will also draw upon the experience from the current program and its successes and gaps. The new program should have an adequate quantification of intermediate-level objectives as well as action plans for each of its broad areas / pillars; and
 - ***Consider a national road safety agency.*** Subject to the outcomes of technical work to prepare a new National Road Safety Program, the Government of Croatia may wish to consider a new National Road Safety Agency. This new agency could have a mandate to manage the Program's implementation, monitor Key Performance Indicators and coordinate the actions of different stakeholder institutions. The Ministry of the Interior has the coordinating role in the 2011-2020 program. However, several other Ministries (Sea/Transport/Infrastructure, Health, Justice, Science/Education) and other institutions (road managing companies, automobile club, county/local government etc.) are involved in its implementation. Support is needed in implementing actions at the national and subnational levels across institutions and a national road safety agency could serve to fulfill that role. The creation of regional and local road safety councils under the aegis of the new agency could also help to coordinate the actions of local governments that also have a key role in improving road safety.

35. ***Adopt a policy of integrated planning across passenger transport modes to enhance the movement of people in Croatia and support services-led growth.*** Integration between different modes of passenger transport is critical for facilitating passenger trips and maximizing the catchment of public transport modes. As in many countries, this is a challenge for Croatia because of different operating companies, different tiers of government authority over services, and the large number of modes (bus, tram, train, aviation, maritime, and non-motorized transport). Croatia has positive domestic example of what is achievable from integrated passenger transport – most notably in the Zagreb area in the form of integrated ticketing between HZPP's suburban rail services and Zagreb's public transport operator (Zagrebački Električni Tramvaj ZET). There are three key elements of an integrated planning approach that the Government of Croatia could consider as a first step to building on such examples: (i) identification and mapping of key physical locations for integration between modes; (ii) development of an institutional framework for harmonizing different investment or service related enhancements at those points of integration; and (iii) developing an investment and services plan to target improvements at those key points. MSTI is currently working on a technical study across these three elements that would culminate in a national plan for integrated passenger transport.

36. ***Across modes of passenger transport there is a need for better data collection on customers and their needs – disaggregated data collection should be a policy priority.*** Passenger transport operations generally benefit from customer-focused decisions that reflect understanding for the unique needs of different target groups. Examples include demographic characteristics (e.g. women, men, age groups etc.), geographically identified groups (e.g. rural or urban), and socio-economic groups (laborers, poor households, professional workers, etc.). While Croatia's national statistics include aggregated data for

transport, there is substantially less information available regarding disaggregated transport behaviors / needs of specific groups. Addressing this would support passenger transport operators to better understand the customers toward whom they need to continuously shape services. Rather than a stand-alone policy initiative, the proposed modality for implementing disaggregated data collection should be mainstreamed in Public Service Contracts, sector studies, and regular reporting requirements between MSTI and Croatia's transport sector undertakings that fall under the Ministry's remit.

6 Proposed implementation roadmap for Policy Actions

#		Starting from	Sub-actions	Milestone	Resource(s)	Area
1.	Integrated Passenger Transport Investment and Service Enhancement Plan	Q1 2020	• Complete technical study	Q1 2021	Supported by Sustainable Croatian Railways in Europe (SUCRE) project	Planning (multi-modal)
			• Draft IPT investment plan	Q3 2021		
			• MSTI approval of IPT investment plan	Q1 2022		
2.	Road SOE Service Contracts	Already underway	• Complete operational restructuring study	Q4 2019	Modernization & Restructuring of the Croatian Road Sector (MARS) project	Governance (road sector)
			• Draft contracts	Q3 2020		
			• Final contracts approved by MOF and MSTI by	Q1 2021		
			• Sign contracts	Q2 2021		
3.	National Railways Strategy	Q2 2019	• Complete technical study (under preparation)	Q3 2020	Supported by Sustainable Croatian Railways in Europe (SUCRE) project	Planning (railways)
			• Final strategy approved by MSTI	Q1 2021		
4.	Multi-Annual Infrastructure Contract for Railways Infrastructure	Q2 2019	• Revise KPIs in existing draft contract	Q4 2019	Eligible for support under Sustainable Croatian Railways in Europe (SUCRE) project	Governance (railways)
			• Final contracts approved by MSTI and MOF	Q2 2020		
			• Sign contracts	Q3 2020		
5.	National Road Safety Program	Q1 2020	• Draft national Program	Q 4 2020	To be determined	Planning (road sector)
			• Final Program endorsed	Q 1 2021		

7 Proposals for strategic (“Flagship”) projects

37. MSTI has identified five strategic “flagship” projects / programs for Croatia’s National Development Strategy, including:

- Construction, rehabilitation, and modernization of railway infrastructure on core TEN-T network and ERTMS implementation.
- Construction, rehabilitation and modernization of road infrastructure on core TEN-T network;
- Purchase of new fleet for rail, road and maritime transport;
- Modernization and extension of sea ports (Rijeka, Ploče, Split, Zadar, Šibenik i Pula), inland ports(Vukovar, Osijek, Slavonski Brod i Sisak) and regional airports (Rijeka, Pula, Zadar i Osijek); and
- Development of integrated passenger transport.

38. Detailed descriptions of these flagship initiatives are included separately from this note. In support of MSTI’s proposed flagships, a set of ideas on targeted interventions are proposed in annexure. These represent specific sub-initiatives or complementary initiatives that the Government of Croatia can consider within its overarching transport sector flagship initiatives that will be included in the National Development Strategy. It may also be appropriate to include the sub-initiatives under sectors beyond transport or under collaborative multi-sectoral approaches. A preliminary summary of project characteristics and overall complexity is included below to inform further due diligence of benefits and potential risks.

Figure 20 Preliminary assessments of interventions to support flagship initiatives

Initiative	potential market demand	Environmental impact	Technical complexity	Financial viability (without cash subsidy)	Fiscal impact	Potential for international support.	Overall complexity
Pillar1: Facilitating movement of people to support services led growth							
Suburban rail development in Zagreb and Split	High	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
National Road Safety Program (2020-2026)	Moderate	Low	Low	Low	Low	High	Low
Serving regions that need to catch up economically with integrated Demand Responsive Transport bus and railway (RH 1 Corridor)	Moderate	Low	Low	Low	Low	High	Low

Initiative	potential market demand	Environmental impact	Technical complexity	Financial viability (without cash subsidy)	Fiscal impact	Potential for international support.	Overall complexity
Pillar 2: Enhanced freight and logistics for competitiveness							
Rail integration at Rijeka port and inland along the RH2 corridor	High	High	High	Low	High	High	High
Pillar 3: Developing high value jobs in transport-related industries							
National Electric Mobility Industry Cluster	High	Low	Low	High	Low	Low	Low
Industrial Development at Osijek Airport	Moderate	Moderate	Moderate	Moderate	Low	High	Moderate

Anex 1: Ideas to support of “Flagship” initiatives

Title:	Pillar 1: facilitating movement of people to support services-led growth Suburban Rail Development in Zagreb and Split
Description:	Expanded and enhanced of suburban railway services in Zagreb and Split. This would include: (i) timetable revisions to increase service frequency; (ii) expanded rolling stock fleets to deliver new timetables; (iii) infrastructure investments to improve reliability, increase passenger amenity, and reduce operating costs.
Problem to be solved:	<p>There is a need for sustainable urban transport in both Zagreb and Split. Both cities have established railway services that have potential to attract incremental demand. However, these services need to expand capacity to attract additional demand and remain competitive relative to road-based modes. In the case of Split, incremental investment is needed to link the city's airport with existing railway infrastructure.</p> <p>Suburban railway lines around Zagreb currently carry the highest levels of passenger density in Croatia and recover between 40% and 65% of their operating cost (the highest of all lines). However, customers currently endure crowding during peak hours which contains demand growth and limits accessibility. International experience suggests that passengers are often more sensitive to levels of crowding than levels of fares. Crowding can also have a particularly detrimental impact on targeted customer segments (e.g. women, families with children) when cramped onboard conditions increase risks to personal security. Several of Zagreb's suburban lines offer only single-track infrastructure which limits the number of train services that can be offered. Strategically adding static or dynamic passing loops and upgrading signaling would alleviate such constraints. There is also a general need to expand the rolling stock fleet used to deliver services as Croatia's passenger operator currently cannot allocate additional modern trains to suburban services. Lastly, there are opportunities for idle railway land in and around Zagreb to be redeveloped for other commercial purposes that would offer a synergy between railway access and passenger demand while also enhancing “place value” of urban areas.</p> <p>Suburban rail development in Split is a classic transit-oriented development opportunity. Adapting existing mainline rail infrastructure that currently runs through the city and constructing a new section of spur line would connect Split's two main transport nodes, including: (i) Split airport which carried approximately 3-4 million passengers per year; and (ii) Split's ferry port which carries approximately 5 million passengers per year. In between these two transport nodes, the municipal government of Split and its surrounding jurisdictions plan to convert former industrial land and an unused railway yard to a mixed commercial and residential use (including social housing). The intended impacts of this project include both enhanced transport connectivity between key nodes as well as urban redevelopment and new industrial development.</p>
Envisaged areas of economic impact:	<ol style="list-style-type: none"> 1. Direct transport cost savings for commuters; 2. Agglomeration benefits and competitiveness enhancement of urban / suburban areas; 3. Emissions reductions via modal shift from private vehicles and reduced congestion; 4. Increased demand for urban public transport leading to improved cost recovery potential for buses, trams, etc.) 5. Opportunities for land redevelopment toward higher value economic activity
Relevance to national strategic framework:	<ul style="list-style-type: none"> • <u>Strategic Goal</u>: Increasing the mobility of people, goods and services • <u>Impact Indicator</u>: Volume of passenger transport relative to GDP

Title:	Pillar 1: facilitating movement of people to support services-led growth Suburban Rail Development in Zagreb and Split
Approach to solution:	<ul style="list-style-type: none"> • Densification of supply and enhancement of service quality of services, including: (i) timetable revisions to increase frequency and reduce door-to-door travel times; (ii) investment in additional rolling stock as required to deliver updated timetables; (iii) concurrent schedule revisions with integrating modes (bus / tram) to facilitate integrated trip making that can support reduced private care use; • Infrastructure enhancements, including: (i) station upgrades to improve passenger amenity and reduce operating costs; (ii) modernization of signaling systems; (iii) investments in static and dynamic passing loops to increase capacity on single line routes for suburban services; and (iv) investments in the facilities required for integrated trip making such as physical linkages with buses, trams, non-motorized transport, and cars (e.g. parking or “kiss and ride”); • Enhancement of measures to seek customer feedback and integrate that into the program of service development. This is particularly important for ensuring that operations remain customer focused and competitive relative to road-based modes.
Envisaged range of costs:	<ul style="list-style-type: none"> • Zagreb: EUR 500 million – EUR 1 billion • Zplit: EUR 250 – 500 million
Required preconditions and actions to mobilize:	<ol style="list-style-type: none"> 1. Define the services to be developed including targets including: (i) frequency; (ii) reliability metrics; (iii) qualitative indexes for passenger amenity. These should reflect the underlying and potential market demand for those services; 2. Undertake / complete feasibility study work – including preliminary / detailed design and Environmental and Social Impact Assessment (ESIA) if required by national law; 3. Program and implement investments and timetable revisions to deliver the intended services. This will include: (i) rolling stock acquisition (specifically new EMUs or DMUs); (ii) station upgrades – including facilities to improve integration with public transport, non-motorized transport, and private vehicles (parking and “kiss and ride”), and (iii) signaling and track investments as required to provide reliability, speed, safety, and lower operating cost. In the case of Split, the program of infrastructure investment will include a connection to the airport (which is in close proximity to the existing suburban line – 7 km); 4. Expand HZPP’s customer feedback functions to ensure that services retain customer-focused orientation. This should include: (i) regular customer surveys and key-performance indicators; (ii) customer advisory panels; and (iii) channels for customer grievance handling and response. 5. Develop an approach to regular fares revisions that would parallel enhancements in service quality with a view to eventually targeting eventual farebox recovery ratios on the order of 130% to 140% of operating costs. This is the approximate range of cost recovery required for suburban rail systems to sustain investments in renewals and enhancements. To be clear, this should be a long-term target such that large fare increases would not take place until services mature. It would also not eliminate the need for capital subsidy to develop initial enhancements to suburban rail systems.

Title:	Pillar 1: facilitating movement of people to support services-led growth Suburban Rail Development in Zagreb and Split	
Risk mgmt. (incl. sustainability & environment / social impact):	Risk	Proposed Mitigation
	Demand and the risk of over-investment	Phasing the development of suburban rail services can allow for gradual market testing and development. An initial starting point would be expansion of HZPP's fleet of EMUs / DMUs (which is already inadequate for current levels of service) and higher frequency of service in the timetable. More costly investments (e.g. passing loops) could follow in sequence as actual demand justifies.
	Sustainability	Passenger rail services in Croatia require operating subsidy which in turn requires fiscal support for sustainability. The proposed mitigation is to implement a transparent regime for suburban fares revision that would parallel enhancements in service quality with an objective of recovering surplus over operating costs as needed to support system sustainability.
	Conflict with freight and regional trains	Conflict is most likely to occur in the lines around Zagreb where both freight and passenger flows are highest in Croatia. At present, infrastructure capacity is not a binding constraint except for the junction of RH1 and RH2 near Dugo Selo. If capacity were to become wider problem, investments in parallel infrastructure could be considered and planned into HZI's capital program.
	Environmental and social risks	Expansion of suburban rail services will need to include mitigation measures for environmental and social impact. These can include measures to reduce noise and vibration (e.g. new rolling stock, track renewal, sound attenuation barriers, and limitation on services during early or late hours). Interventions that require land acquisition and / or resettlement (e.g. development of passing loops) will need to follow Croatia's legal and regulatory framework for impact assessment and mitigation.

Title:	Pillar 1: facilitating movement of people to support services-led growth National Road Safety Program (2020-2026)
Description:	The current National Road Safety Program of the Republic of Croatia (2011-2020) will end in 2020. There is a need to carry forward positive interventions that began under this program and to identify additional measures that address gaps in its effectiveness. A successor program should proceed under the aegis of Croatia's National Development Strategy.

Title:	Pillar 1: facilitating movement of people to support services-led growth National Road Safety Program (2020-2026)
Problems to be solved:	Croatia's motorway density is high by EU standards (approx. 23 km of network / 1000 km ² of land area) and well developed by international standards. However, the rate of road-related fatalities per 100,000 people in Croatia is more than 63% higher than the average for EU 28 countries. Specific interventions that can improve road safety include: (i) improvements in safety barriers; (ii) site specific infrastructure interventions at high-accident locations; (iii) investments in Intelligent Transport Service (ITS); (iv) introduction of weigh-in-motion stations to control for overloading; and (v) measures to increase compliance with the EU's Directives on road safety (2008/96) and tunnel safety (2004/54). These measures, along with the areas of action identified in the National Road Safety Program of the Republic of Croatia (2011-2020) are heartening but have not proven effective. As the current national program comes to an end, there is an opportunity for Croatia to develop a successor program that addresses gaps identified by the European Commission ⁸ , the World Bank's team, and others and to implement this under the aegis of the National Development Strategy. Key enhancements should relate to addressing the following areas of priority: (i) Enforcement gaps, need for behavior change, and gaps in road user education; (ii) Seasonality and locality factors that contribute to poor safety; and (iii) Institutional ownership and coordination.
Envisaged areas of economic impact:	1. Reduced mortality and morbidity due to avoided road crashes.
Relevance to national strategic framework:	<ul style="list-style-type: none"> • <i>Strategic Goal:</i> Development of transport infrastructure, operations and organizations • <i>Impact Indicator:</i> Global Competitiveness Index - infrastructure pillar
Approach to solution:	<p>The proposed successor program would focus on the following under a safe systems approach:</p> <ul style="list-style-type: none"> • Safer road users through enforcement and education with a focus on alcohol use / abuse, seatbelts, helmet use, child-restraint, vehicle standards, and speed reduction; • Safer infrastructure with a focus on targeting measurable increases in iRAP (International Road Assessment Program) scores along sections of the road network – particularly where seasonality and locality factors contribute to poor safety. An accompanying program of data and analytics should support targeting and technical assessment of such locations; and • Safer vehicles through enhanced requirements for passive safety systems and expanded restrictions on the registration of vehicles that do not include these features. <p>The successor Program would also target enhanced institutional effectiveness by assigning specific institutional accountability (along with financial resources) for interventions. This is a key gap under the current National Road Safety Program.</p>
Envisaged range of costs:	<ul style="list-style-type: none"> • EUR 500-750 for program design (not including implementation)
Required preconditions and actions to mobilize:	<ol style="list-style-type: none"> 1. Develop a successor National Road Safety Program beginning with a stock-taking and gap analysis of its predecessor. Consultations with private industry, civil society organizations, public-sector stakeholders, and the public should feed into the new Program; 2. Nominate specific institutional accountability for delivering interventions identified under the successor Program; and 3. Deploy an oversight and monitoring mechanism to ensure public accountability for the successor Program's effectiveness.

⁸ "Road Safety in the European Union – Trends, statistics and main challenges" (April 2018); and European Commission, Road Safety Country Overview - Croatia, European Commission, Directorate General for Transport (September 2016).

Title:	Pillar 1: facilitating movement of people to support services-led growth National Road Safety Program (2020-2026)	
Risk mgmt. (incl. sustainability & environment / social impact):	Risk	Proposed Mitigation
	Institutional coordination and accountability	Designate a pinnacle institution with overall accountability, financial resources, and authority to carry forward interventions. This body should be directly accountable to the Prime Minister's office for the Programs effectiveness.
	Sustainability	Implementation will require two key elements for sustainability: (i) fiscal allocation to support program execution; and (ii) maintenance of the Government mandate for the pinnacle institution to coordinate the program. These mitigations will require strong policy commitment from the Government of Croatia.
	Public acceptance and support	Initiate a public outreach and communications component under a successor Program. This may benefit from the services of an external public relations firm that can augment government's efforts.
	Difficulties of cultural and behavioral change	Accelerate Croatia's use of the "safe systems" approach that combines efforts to achieve safer road users, safer vehicles, and safer infrastructure in tandem. This includes development of infrastructure with higher iRAP protection scores, vehicles standards that require greater passive safety features, and sustained promotion and education efforts to educate road users.

Title:	Pillar 2: enhanced freight and logistics for competitiveness Rail integration at Rijeka port and inland along the RH2 corridor
Description:	Development of railways connectivity at the port of Rijeka and inland between Škrljevo and Ogulin to facilitate access to the RH2 corridor. This would include: (i) railway-port integration at the port of Rijeka; and (ii) a lowland option to reduce elevation change for railway services accessing the RH2 corridor;
Problem to be solved:	There is an opportunity to build on increased container traffic through Rijeka and along the Rijeka-Zagreb railway corridor using improved railways connectivity. In 2017, this corridor accounted for 28.9% of all freight gross tone-km in Croatia. Between accession in 2013 and 2017 gross tone-km on the Zagreb-Rijeka corridor grew by 32%. Growth in tone-km from the Brajdica container terminal to Sušak Pećine (the M604 railway line) increased by 291% between 2013 and 2017. A present, key challenges facing the railways freight leaving from Rijeka are: (i) poor railways integration with the port itself; and (ii) difficulties traversing the segment of Croatia's RH2 corridor between Rijeka and Ogulin where cumulative elevation change requires multiple locomotives, shorter trains, and shunting / train reformation. HZI has investigated a lowland alternative which requires further project preparation.
Envisaged areas of economic impact:	<ol style="list-style-type: none"> 1. Direct transport cost savings for shippers and transport operators; 2. Emissions reductions via modal shift; and 3. Agglomeration benefits for firms.
Relevance to national strategic framework:	<ul style="list-style-type: none"> • <u>Strategic Goal</u>: Increasing the mobility of people, goods and services • <u>Impact Indicator</u>: Logistics Performance Index

Title:	Pillar 2: enhanced freight and logistics for competitiveness Rail integration at Rijeka port and inland along the RH2 corridor	
Approach to solution:	<ul style="list-style-type: none"> • Improve railways connections at the port of Rijeka to reduce logistics costs and facilitate modal shift from road-based modes that travel through the city of Rijeka. This would precede any investments in a lowland project for the RH2 corridor; • Define and assess lowland project alternatives for improved railways connectivity from Škrljevo to Ogulin that can provide easier access from Rijeka to the RH2 corridor; and • Prepare and implement a lowland project option to enhance railways connectivity with the port of Rijeka. 	
Envisaged range of costs:	<ul style="list-style-type: none"> • EUR 4 – 6 billion 	
Required preconditions and actions to mobilize:	<ol style="list-style-type: none"> 1. Implement the investments that have already been prepared with EU funding for railways integration at the port of Rijeka; 2. Conduct a feasibility assessment and engineering preparations for lowland options 3. Complete environmental and social assessments for a preferred “lowland” alternative; and 4. Finance and execute a preferred “lowland” option. 	
Risk mgmt. (incl. sustainability & environment / social impact):	Risk	Proposed Mitigation
	Demand - Rijeka is one of several northern Adriatic ports that compete for shipments such that returns on investment could suffer.	Implementation of improved railways connectivity at the port (which is lower risk) would precede investments in any lowland option by virtue of required preparations. This would offer a chance to observe market response to enhanced railways infrastructure prior to making more complex and costlier investments.
	Fiscal – the likely cost of a lowland option between Škrljevo and Ogulin is tentatively estimated to cost between EUR 4-6 billion which could prove unaffordable.	The financial dimensions and overall affordability of a lowland option will be studied in detail during project preparation such that unaffordable options (or the entire project) would be discarded if necessary.
	Environmental and social impacts of a lowland option are likely to be significant – including impacts on sensitive areas	These would be considered, along with viability of mitigations during a full feasibility study and alternatives analysis of different options
	Sustainability – including ability to maintain infrastructure once built	Developing the lowland project will require both operational and financial capacity enhancement of HZI (or an alternative service provider) to manage assets once completed.

Title:	Pillar 3: “developing high value jobs in transport-related industries” National Electric Mobility Industry Cluster
Description:	Development of an electric mobility industry cluster around Croatia’s domestic electric mobility champion (Rimac Automobili).

Title:	Pillar 3: “developing high value jobs in transport-related industries” National Electric Mobility Industry Cluster
Problems to be solved:	Electric mobility is, at its core, a disruptive transition for the world’s automotive industry. In addition, the global market for electric mobility products is expanding rapidly. Croatia can capitalize on this disruption by incubating an industry cluster that focuses on high-value innovation and services for the global electric mobility market.
Envisaged areas of economic impacts:	1. Jobs and employment.
Relevance to national strategic framework:	<ul style="list-style-type: none"> • <u>Strategic Goal</u>: Development of transport infrastructure, operations and organizations.
Approach to solution:	<ul style="list-style-type: none"> • Encourage co-location of firms engaged in electric mobility in order to achieve agglomeration benefits. The shared campus facility proposed by Rimac Automobili could make use of idle government land and provide the location for such an industry cluster to develop. As a condition of providing such a site, the Government of Croatia could impose conditions for facilities sharing, cooperation with local academic institutions, internship programs, and open access to new industry participants; • Engage academic and technical training institutions to develop curriculum around engineering and technical disciplines needed to support expanded need for skilled workforce with expertise in electric mobility technologies; • Encourage innovation-centric business models for the electric mobility industry that align with Croatia’s credible advantages relative to lower-cost production locations. This should include international outreach to attract additional firms to Croatia.
Envisaged range of costs:	<ul style="list-style-type: none"> • In-kind contribution of government land (about 22 hectares) for industry location; • Training and development programs (EUR 250,000 – EUR 1 million) per year
Required preconditions and actions to mobilize:	<ol style="list-style-type: none"> 1. Allocate a site for an electric mobility cluster to develop around the current national champion; 2. Establish and oversee implementation of conditions for use of the government provided site for Croatia’s electric mobility cluster; 3. Fund academic institutions to develop curriculums in vehicle / electrical engineering and technical skills training; 4. Market and promote Croatia’s electric mobility cluster to encourage private investment and the development of additional domestic firms. Channels such as the Croatian Chamber of Commerce and economic representatives stationed at Croatia’s foreign embassies could be used for this purpose.

Title:	Pillar 3: “developing high value jobs in transport-related industries” National Electric Mobility Industry Cluster	
Risk mgmt. (incl. sustainability & environment / social impact):	Risk	Proposed Mitigation
	Unfair competition between domestic firms	Conditions attached to the provision of a government-owned site should be designed to ensure open access to facilities (e.g. testing and research) that would be developed on that site. These same conditions should also provide for fair protection of intellectual property that individual firms may develop.
	Sustainability – electric mobility may be displaced by other technologies in the future (e.g. hydrogen)	Provide for the return of Government land or other assets in the event that participating firms become insolvent or exit the industry so that firms specializing in new vehicle technologies may take their place.
	State aid regulations	Retain legal services to advise on government support measures and maintain compliance with EU regulations.
	Environmental and social impact – conversion of unused land for industry cluster location	Development of industry locations will require environmental and social impact assessments and corresponding mitigations in accordance with national law.

Title:	Pillar 3: “developing high value jobs in transport-related industries” Industrial Development at Osijek Airport	
Description:	Osijek airport is geographically positioned between Osijek, Vinkovci, and Vukovar. It offers a 2,500 meter runway which is large enough to accommodate production aircraft that comprise the Airbus, Boeing, Bombardier, and Embraer fleets. A key advantage of Osijek airport is that it is not constrained by topographical features (mountains) or surrounding land use that would be incompatible with its development. There is a potential for supporting the development of an aviation industry hub around Osijek that would provide higher-value jobs in the Slavonia region. In particular, the Maintenance, Renovation, and Overhaul (MRO) market for aircraft services could offer a starting point for developing such a cluster that may eventually also include aircraft component production or assembly. The global volume of the MRO industry is approximately US\$ 115 billion and is growing at annual rates between 3-4% per year as global aircraft fleets increase. European markets account for approximately 22% of the global total.	
Problems to be solved:	There is a need for Croatia to develop employment opportunities in the Slavonia region and to simultaneously derive better value from the infrastructure assets that comprise the Osijek airport. The absence of major population centers or air-cargo intensive industries around Osijek airport suggest that its potential for expanding passenger or air freight markets is unlikely. However, these same factors combined with a geographical position near air hubs in Central and Southern Europe make Osijek airport a good candidate for MRO services that support the expanding aviation industry.	
Envisaged areas of economic impact:	1. Jobs and employment.	
Relevance to national strategic framework:	<ul style="list-style-type: none"> • <i>Strategic Goal:</i> Development of transport infrastructure, operations and organizations. 	

Title:	Pillar 3: “developing high value jobs in transport-related industries” Industrial Development at Osijek Airport	
Approach to solution:	<p>The approach for this flagship is to attract an established transport sector industry into a lagging region of Croatia by:</p> <ul style="list-style-type: none"> • Offering an unencumbered airport location in close flight distance to major European hubs; • Committing government support to development of airport facilities and complementary infrastructure based on industry needs; • Investing in skills development in Croatia to support industry workforce needs. 	
Envisaged range of costs:	<ul style="list-style-type: none"> • EUR 10 million – 30 million (assuming no runway extension / rehabilitation) 	
Required preconditions and actions to mobilize:	<ol style="list-style-type: none"> 1. Undertake industry outreach and “road show” to solicit interest in MRO and / or manufacturing investment around Osijek airport; 2. Undertake feasibility study of infrastructure works and environmental / social impact assessment as required by national law; 3. Based on industry response, program investments in airport facilities investments and land acquisition to accommodate industry needs; 4. Fund the establishment of a technical training center to develop the Slavonia region's technical workforce that will support MRO enterprises at Osijek airport. 	
Risk mgmt. (incl. sustainability & environment / social impact):	Risk	Proposed Mitigation
	Viability / sustainability – likelihood of long term market appetite for investment in new locations	The MRO market in Europe is currently capacity constrained due to overall growth in aviation demand and aircraft fleets. Current service providers are looking for expansion opportunities. However, this does not guarantee the attractiveness of Osijek as an investment destination and market sounding should be used to test industry's level of interest before any public investments are made.
	Environmental impacts resulting from increased localized aviation emissions and noise.	The immediate vicinity around Osijek airport is a low population density area and these impacts are likely to be manageable with basic mitigations such as design of approach and departure procedures to avoid what populations may live in close proximity. There are also no major airports around Osijek such that surrounding airspace is unlikely to be negatively affected by additional congestion or air traffic control constraints.

Title:	Pillar 1: facilitating movement of people to support services-led growth Serving regions that need to catch up economically with integrated Demand Responsive Transport bus and railway (RH 1 Corridor)
Description:	This initiative would do three things: (i) develop Demand Responsive Transport services in rural areas; (ii) integrate those services with a redesigned timetable for passenger operations that would provide limited stopping and faster travel times for all passengers.

Title:	Pillar 1: facilitating movement of people to support services-led growth Serving regions that need to catch up economically with integrated Demand Responsive Transport bus and railway (RH 1 Corridor)
Problem to be solved:	<p>Croatia struggles with ensuring that rural communities have access to public transport services and has relied heavily on railways to provide basic connectivity. However, the ambitious service delivery mandate for railways in low demand areas impairs operational and financial capacity to serve high demand markets. Even for routes that connect population centers of reasonable size, intermediate stops in rural locations in-route produce long travel times that detract from ridership. For example, about half of the trains that HZPP runs from Zagreb to Vinkovci (273 kms) stop 49 times along the way – roughly 1 stop every 5.7 km. An end to end trip takes 5+ hours. There are 34 stops in population centers with less than 5,000 people including 14 stops in population centers with less than 1,000 people. All but two to three services per day turn back before crossing the Serbian border rather than continuing the extra 150 km to the Belgrade area (1.7 million people). There is a definite need for rural communities in Croatia to have public transport access. However, the modality for delivering that access can make more efficient use of the railway through integrated transport services that facilitate shorter travel times for all passengers. One solution could be Demand Responsive Transport (DRT) feeder services designed to integrate with a limited stopping railway timetable such that rural demand would be aggregated at 2-3 intermediately spaced nodes (e.g. Kutina, Slavonski Brod, Vinkovci).</p> <p>Demand Responsive Transport (DRT) is a road-based public transport alternative that typically uses smaller buses / vans that do not operate according to a fixed schedule. DRT makes use of flexible service routes that allow for coverage of geographically large lower population density areas. This works through pre-booking schemes that combine both new and old technologies (e.g. booking rides by voice over a landline). The routing of vehicles and the travel times for passengers are optimized according to actual demand. Establishing DRT services in Croatia's rural areas and integrating those services with passenger rail operations offers a potential opportunity to both increase railways demand and enhance the access that rural communities enjoy.</p>
Envisaged areas of economic impact:	<ol style="list-style-type: none"> 1. Direct transport cost savings for rural customers AND broader transport users; 2. Access to social services; 3. Access to jobs and employment.
Relevance to national strategic framework:	<ul style="list-style-type: none"> • <u>Strategic Goal</u>: Increasing the mobility of people, goods and services • <u>Impact Indicator</u>: Volume of passenger transport relative to GDP
Approach to solution:	<ul style="list-style-type: none"> • Identify a preferred institutional arrangement for rural bus service delivery. This should include identification of operator / authority roles and a proposed contracting approach; • Develop a proposed limited stopping timetable on the RH1 corridor East from Zagreb that would include international connection to Belgrade. The timetable should include no more than 3 intermediate stops within Croatia; • Define service areas for flexible route bus transport that would integrate with proposed stop locations and connect all communities without direct railway access. These services will integrate with limited stopping railways timetables; • Develop pre-booking and dispatch systems to provide customers with access to Demand Responsive Transport and to manage vehicle routing / integration with railways; • Undertake extensive public outreach and communications campaigns to sensitize users about new DRT services and opportunities for integrated trip making with railways for long distance travel needs.
Envisaged range of costs:	<ul style="list-style-type: none"> • DRT services along RH1 corridor: EUR 500,000 – EUR 1 million to establish and EUR .3 – EUR .75 per km to operate based on route design and fleet decisions.

Title:	Pillar 1: facilitating movement of people to support services-led growth Serving regions that need to catch up economically with integrated Demand Responsive Transport bus and railway (RH 1 Corridor)	
Required preconditions and actions to mobilize:	1. Policy decision on institutional approach; 2. Reprogramming of the railways timetable on the RH1 corridor; 3. Technical study to define service areas, fares, booking and reservation system; and 4. Preparation and launch of a communications campaign.	
Risk mgmt. (incl. sustainability & environment / social impact):	Risk	Proposed Mitigation
	Demand	The initiative will require extensive public outreach and communications to ensure demand for the service. This will need to include various media channels as well as physical marketing in rural communities (e.g. via post, govt. buildings, churches, etc.)
	Sustainability	DRT aims at serving low population density areas and typically operating subsidy to be sustainable. The project will require a financial analysis to quantify expected fiscal costs and to secure appropriate budget resources from MOF or local government authorities.
	Environmental and social risks	Development of DRT services are less likely to have significant environmental or social impacts. However, the design of DRT services will need to involve extensive community consultation so that needs of beneficiaries and any unforeseen impacts can be considered.