SERBIAN RAILWAYS

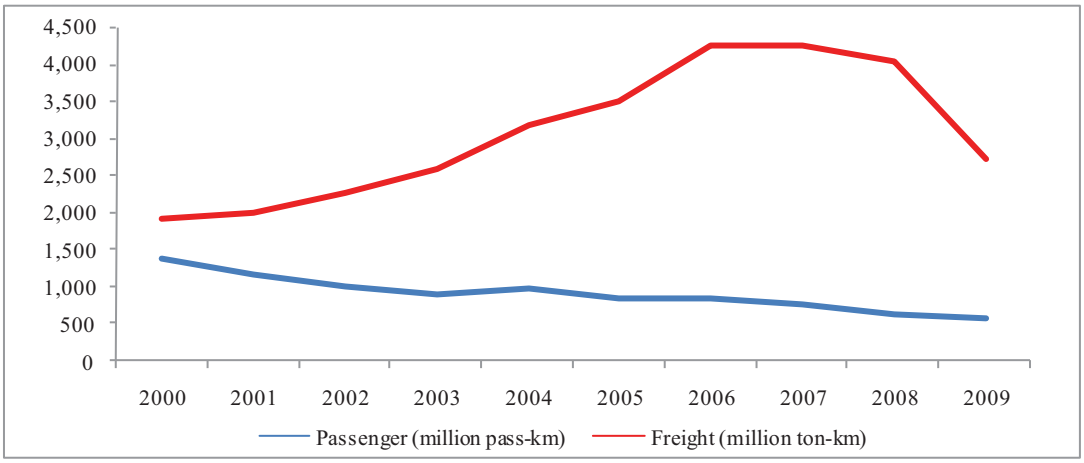
377. **Serbian Railway (*Železnice Srbije*, ŽS) is the state-owned railways created on March 1, 2005**. This is the date when a new railway law and decree on the reorganization of the railways were enacted. The operating assets of the former railway ZTP were transferred to Serbian Railways. The Parliament of the Republic of Serbia passed the new Law on Railways on February 17, 2005; it became effective on March 1, 2005. The Law indicates that public rail infrastructure is owned by the state and open to all licensed rail transporters. Initially, Serbian Railways will be the public rail infrastructure manager, but the law allows the licensing of other infrastructure managers. Likewise, it allows for multiple rail operators, of which the Serbian Railways freight and passenger units will be only two. The new law also allows the Government to provide subsidy through the introduction of a Public Service Obligation (PSO) to continue loss-making passenger services—thereby making the provision of any subsidy explicit for each and every loss-making service—and to consolidate the historic debt of the railways.

378. **The reform of the railway sector in Serbia remains very much a work-in-progress, with delays leading to considerably adverse impacts on operational and financial performance.** Serbian Railways faces a number of immediate challenges. These include: (i) obtaining sufficient funding to maintain and improve rail infrastructure, and clear the backlog of deferred maintenance, manifest in the form of speed restrictions on the network, and eliminate critical bottlenecks; (ii) defining and implementing a network rationalization program in order to focus resources on the most important parts of the network; (iii) obtaining sufficient investment to replace its life-expired rolling stock; (iv) developing and introducing a new contractual relationship between the Government and Serbian Railways for socially necessary but loss-making passenger services through Public Service Obligation/Contracts (PSO/PSC); (v) financial restructuring through consolidation of historical debt and liabilities of Serbian Railways; (vi) capacity-building to strengthen railway maintenance and rehabilitation practices; (vii) introducing of a strategic approach to network management and investment planning; (viii) implementing an appropriate track access charge system; (ix) realizing further productivity improvements, particularly that of its labor force; and (x) developing and establishing an integrated financial and cost accounting system.

Operational Performance

379. **Freight and passenger traffic volumes have been moving in opposite directions over 2000-2007, whereas in 2008-2009 both suffered declines due to the impact of the international financial crisis.** In 2009, passenger traffic declined to 582 million passenger-km, down from 648 million in 2008, and freight traffic plummeted by 32 percent, to 2,723 million ton-km. As Figure 182 shows, the rise in traffic volume has been uneven, with a steady rise in freight traffic in 2000-2007, compensating for a decline in passenger traffic over the same period. If we take traffic in 2000 as a base, freight traffic rose by 42 percent over 2000-2009; in stark contrast, passenger traffic declined by 58 percent. Overall, freight and passenger traffic equaled 3,305 million traffic units in 2009, while in 2000 total traffic equaled 3,304 million traffic units—thus, there has been no increase in the period, with traffic peaking at 5,078 million traffic units in 2006, and declining thereafter, well before the international financial crisis.

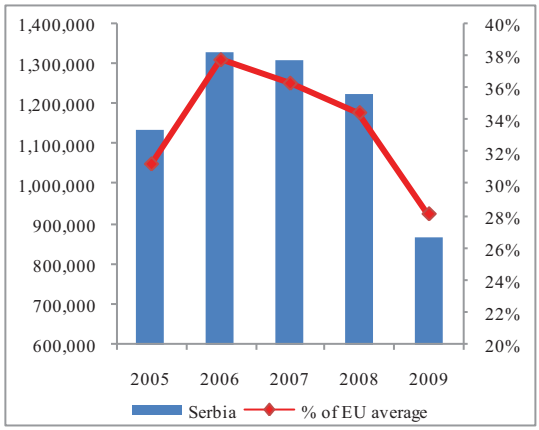
Figure 182: Serbian Railways – Passenger and Freight Traffic, 2000-2009



Source: UIC.

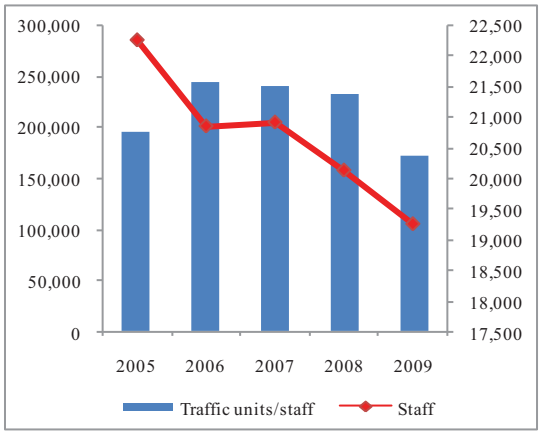
380. **Rail traffic intensity has declined over 2005-2009, representing a little over a quarter of the EU average**. In 2009, traffic intensity in Serbia with 867,682 traffic units per rail route-km—is equivalent to 28 percent of the average traffic intensity of the EU, compared to 38 percent in 2000. Considering the high percentage of infrastructure fixed costs, lower traffic intensity makes access to the country's infrastructure more expensive than for other railway networks. Traffic intensity is being pulled down by passenger services. In 2009, freight traffic intensity, at 714,886 traffic units per rail route-km, is equal to 56 percent of the EU average—with the latter measure twice as high as the total traffic density vis-à-vis the EU average. Nevertheless, the intensity of infrastructure usage remains low, with negative financial implications given the high fixed-costs of rail infrastructure.

Figure 183: Serbia – Rail Traffic Intensity



Source: UIC.

Figure 184: Serbia – Traffic Units per Staff and Staff Levels



Source: UIC.

Figure 185: The Rail Network of Serbia

Source: World Bank.

381. **Transit traffic has been the large driver in the growth of freight traffic over the decade**. Domestic traffic in 2006 was only 546 million ton-km, or 15 percent of the total, declining to a mere 399 million ton km in 2009, or 13 percent. According to Serbian Railways, 87 percent is international transport, and in turn this is dominated by transit traffic, which accounts for 66 percent of freight traffic in terms of ton-km. Freight traffic started to decline in the first half of 2008. The decline accelerated in 2009, when industrial production fell by 12.1 percent, local clients such as US Steel Serbia reduced freight transport needs significantly, and European freight forwarders reduced their traffic through Serbia. A mild recovery was underway in the second half of 2009.[151] However, low freight traffic volumes are also due to the poor condition of the infrastructure, and the lack of adequate shunting engines and diesel locomotives.[152] The main commodities carried are coal and coke, metallurgy products, and ores and concentrates. The average commercial speed on freight trains fell from 25.1 km/hour in 2006 to 23.6 km/hour in 2007; it rose to 23.9 km/hour in 2008 and to 25.19 km/hour in 2009.

382. **Poor performance of the passenger sector has continued during the decade, with significant traffic decline.** Passenger traffic has been declining continuously over the decade—from 1,387 million pass-km in 2000, to 762 million pass-km in 2007, and to 582 million pass-km in 2009. Out of 8.37 million passengers transported in 2009, 36 percent used Belgrade's urban rail system Beovoz, although this market segment generated a mere 6 percent of total revenues. The number of international passengers, at 688,000 in 2009 is small, and nearly half that of 2007. Although international passenger transport volumes are low and equal to a mere 8 percent of the total, revenues from these services account for 53 percent of total passenger revenues. Other domestic passenger transport accounts for 56 percent of the total number of passengers transported, and around 40 percent of revenue. These figures suggest that revenue collected from the urban rail system is sub-optimal, due to a combination of low tariffs, significant fare evasion, and poor-quality unreliable service.

383. **Although staffing levels have declined in recent years, staff productivity as measured by traffic unit per staff, has not improved over 2005-2009.** At the start of the decade staff numbers stood at 32,800, but had declined to 22,271 by 2005 and to 19,249 by 2009 (Figure 184). Staff productivity, measured by total traffic units—freight million ton-km and million passenger-km—has not improved significantly despite the reductions in staff: from 194,603 in 2005 to 232,259 in 2008, before dropping to 171,697 in 2009. Productivity rises have slowed over 2005-2009. This reflects declining passenger volumes, a slowdown in voluntary departures, and the impact of the financial crisis on traffic volumes in the second half of 2008 and in 2009. Despite a reduction of about 12,000 employees—a third of its work force—in the past six years, Serbian Railways remains overstaffed. To put this in perspective, Serbia's productivity level is only 28.7 of the EU average, which stood at 597,618 traffic units per employee in 2009. Reductions in staff, which have occurred on a voluntary basis, have been dependent on budget support for financing

[151] Serbian Railways (2010a), Business Plan Implementation Report of the PE "Serbian Railways" for 2009, Belgrade, April 2010.

[152] This may be not only to insufficient locomotives but suboptimal fleet management. Locomotives are often not available when needed due to train delays and the inability to fulfill scheduled timetables.

of severance payments, because Serbian Railways uses funds from the central government for payment of wages.[153]

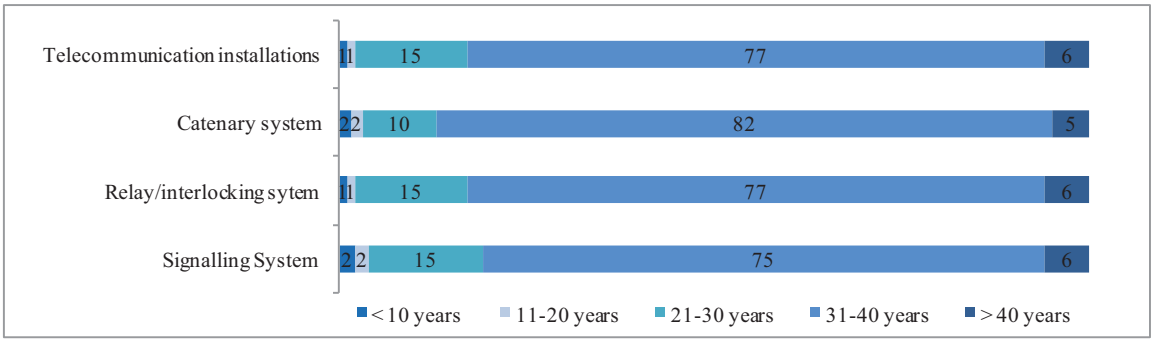
384. **Low commercial speeds, lack of attractive coaches, and limited rolling stock adversely affect rail passenger services.** The average commercial speed for passenger services in 2007 was only 43.3 km/hour, and this has remained unchanged over 2008-2009. Apart from the low speed, factors adversely affecting passenger transport include train cancellations due to lack of traction and train delays caused by slow runs—all of which make passenger services unattractive when compared to bus services or cars. For 2010, Serbian Railways is forecasting a modest recovery, to 645 million passenger-km. The broader issue of how Serbian Railways can continue operating the same level of services with traffic levels equal to less than half of the start of the decade remains an unanswered question. Closure of services that cannot be justified from a public service perspective and increased efforts to raise urban rail transport revenue appear critical.

385. **Railway infrastructure is aging and in poor condition**. There are about 3,809 km of network, of which only 31 percent is electrified, and 7 percent is double-tracked, with an average age of 38 years.[154] Line speeds do not exceed 60 km/hour on 57 percent of the network, and only 3 percent of the network has a line speed that exceeds 100 km/hour—this, despite the fact that the average design speed is 94.5 km/hour. In 39 percent of the network the loading capacity is below 18 tons. Insufficient investments in maintenance have caused the instability and deformation of tracks, eroded tracks, and rotten sleepers. To preserve safety, temporary speed restrictions have been introduced, which is actually something of a misnomer, because limited resources mean that the restriction stays for a lengthy period of time. In 2009, 33 slow runs on 658 km of track were introduced due to the poor conditions of superstructure and substructures in order to maintain traffic safety levels. About 57 percent of the main lines last had a major overhaul more than thirty years ago, with only 294 km in the last 10 years.

386. **Important backlogs have accumulated with regard to the telecommunication systems, signaling systems, power supply, catenaries, and interlocking systems.** The average ages of these asset types are presented in Figure 186, with the age of over three-quarters of them 31-40 years. This also reveals the limited nature of investments in the last 10 years—in all cases, 2 percent or less has been modernized. The poor condition of the rail infrastructure has not only affected service quality and reliability, but will also lead to higher future costs, because costs of rehabilitation of infrastructure are high when compared to timely maintenance.

[153] Serbian Railways uses subsidies from the central government for payment of wages. See Serbian Railways (2010), Business Plan of the PE "Serbian Railways" For 2010, Belgrade, February 2010.
[154] Total network length includes 334 km in Kosovo and Metohija, 39 km used only as factory sidings, and 180 km which are out of service.

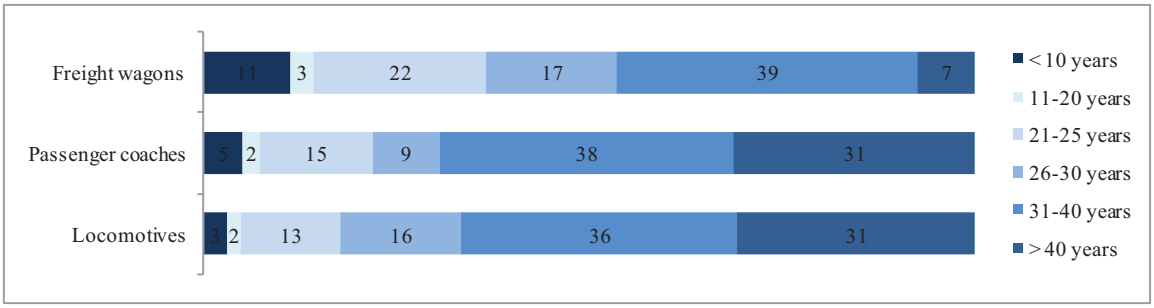
Figure 186: Serbian Railways - Age Structure of Rail Infrastructure Equipment



Source: Serbian Railways.

387. **The rolling stock fleet is aged and in need of replacement, but the overall situation is better than with rail infrastructure.** The locomotive fleet consisted of 413 locomotives in 2009, but the active fleet was 119. The current fleet of active freight wagons totals approximately 8,980 wagons; a little over a third is in good working order—the average operational age is in excess of 30 years of age, close to the end of their operational life. Serbian Railways estimates that 67 percent of its locomotives, 69 percent of its passenger cars, and 46 percent of its freight wagons are over 30 years old. It is clear that a considerable portion of this fleet will need to be retired from operational service in the next few years (Figure 187). In addition, the technical characteristics of the current fleet are inconsistent with current and projected market demands. A modernization plan, partly funded by an EBRD loan includes the delivery of 30 electric motor trains.

Figure 187: Serbian Railways - Age Structure of Rolling Stock



Source: Serbian Railways.

388. **Rolling stock productivity is less than 50 percent of the EU average, and has deteriorated over 2005-2009.** Freight wagon productivity increased by 46.3 percent over 2005-2008, attaining 64 percent of the EU average, before declining in 2009 due to the 32.4 percent decline in freight traffic, measured in ton-km. Likewise, locomotive productive rose over 2005-2008 by nearly 20 percent, before declining by 59 percent in 2009. However, coach productivity has performed poorly throughout 2005-2009, reflecting continuing declines in passenger traffic—by 2009 coach productivity stood at a mere 18 percent of the EU average. Low utilization levels of rolling stock reflect in part low availability of fleet due to the operational fleet being a fraction of the total. For freight wagons, the operational fleet is only 54 percent of the total stock, and for passenger coaches the figure is 28 percent. However, it is also likely to reflect low fleet management efficiency. Given the low and continuously declining passenger volumes, a downsizing of the coach fleet appears sensible. The combination of these factors generate higher

freight and passenger operating costs for Serbian Railways, making them less competitive vis-à-vis trucks and buses.

Table 40: Serbian Railways - Rolling Stock Productivity

Year	Freight Wagon Productivity		Coach Productivity		Locomotive Productivity	
	Serbia	EU average = 100	Serbia	EU average = 100	Serbia	EU average = 100
2009	303,229	49	742,347	18	10,015,152	38
2008	482,232	64	826,531	21	14,125,680	51
2007	506,944	61	972,360	21	15,094,653	53
2006	469,492	58	1,079,082	25	14,935,294	54
2005	329,704	44	1,086,735	29	11,873,973	43

Source: UIC.

Financial Performance and Investment Plans of Serbian Railways

389. **Financial performance remains weak, with continued financial losses over the course of 2005-2009.** In 2008, financial losses reached Euro 193 million, despite revenues from the Serbian central budget equal to Euro 138 million. In the last five years, Serbian Railways has generated losses despite higher traffic volumes, because commercial revenues cover only a small fraction of total operating costs, and total budgetary support in 2009 was equal to 72 percent of operating revenues (Table 41). In 2009, freight and passenger revenues accounted for 57 percent and 9 percent of the railway commercial revenues respectively, with other operating revenues generating the remainder. The working ratio, a key financial indicator, improved from 1.67 in 2005 to 1.52 in 2008, but remains unsatisfactory.[155] This reflects the fact that operating costs (without depreciation) exceeded operating revenue—in fact, operating revenues covered only 50 percent of operating costs. State operating subsidies from the budget cover 36 percent of working costs, allowing the working ratio to be under one 1, when the state's funds are included. Serbian Railways incurred accounting losses because of uncompensated depreciation and financial and non-operating costs. Comparing the first half of 2009 with the same period in 2008, reveals worsening financial results, due to sharply lower traffic volumes.

390. **Cumulative financial losses over 2000-2009 reached Euro 1.24 billion by end 2009**.[156] The cumulative losses over 2000-2009 amount to 45 percent of Serbian Railways' capital, up from 42.82 percent in 2008. As stated in Serbian Railways' Business Plan 2010, the continued reduction in capital puts into question its financial sustainability in the absence of countervailing measures. Among the causes for this poor financial performance are: (i) unprofitable passenger services not financed through PSO contracts or terminated; (ii) lack of business operational efficiency; (iii) excessive staffing levels in relation to traffic volumes; (iv) poor quality and reliability of services due to condition of infrastructure and rolling stock, which reduces demand,

[155] This is defined as the operating cost before depreciation and provisioning divided by the operating revenue, excluding budget support.

[156] Cumulative financial losses over 2000-2007 reached RSD 93.7 billion (Euro 1.17 billion), rising to RSD116.3 billion (Euro 1.24 billion) in 2009.

particularly for passenger transport; and (v) the absence of financial consolidation to deal with historic debts of Serbian Railways and its daughter companies.

Table 41: Serbian Railways Financial Performance (Euro millions)

	2005	2006	2007	2008 Q1	2008 Q2	2008	2009 Q1	2009 Q2
TOTAL REVENUE	241	312	374	58	81	329	52	68
Passenger	18	17	19	4	3	18	3	3
Tickets	18	17	19	4	3	18	3	3
Freight	83	102	113	20	32	109	15	13
Other	28	71	101	1	11	64	0	17
Total operating revenues	129	190	233	25	47	191	18	33
State operating subsidies	112	122	141	33	34	138	34	35
Passenger	0	0	0	0	0	0	0	0
Freight	0	0	0	0	0	0	0	0
Infrastructure	0	0	0	0	0	0	0	0
TOTAL EXPENDITURE	465	393	436	91	103	522	77	87
Materials	18	19	23	4	4	19	4	4
Fuel, electricity	20	24	26	7	7	29	4	5
Salaries and allowances	120	127	135	41	38	160	36	36
Outsourcing and other services	57	66	103	13	18	83	10	10
Depreciation	98	99	93	22	23	89	19	19
Total operating expenditures	313	335	380	87	90	379	73	73
Non-operating expenditures	151	57	57	4	14	143	5	14
NET INCOME								
With state contribution	(223)	(81)	(63)	(33)	(23)	(193)	(25)	(19)
Without state contribution	(335)	(202)	(203)	(67)	(56)	(331)	(59)	(54)
WORKING RATIO								
With state contribution	0.89	0.76	0.77	1.11	0.83	0.88	1.02	0.79
Without state contribution	1.67	1.24	1.23	2.63	1.42	1.52	2.94	1.62

Source: Serbian Railways.

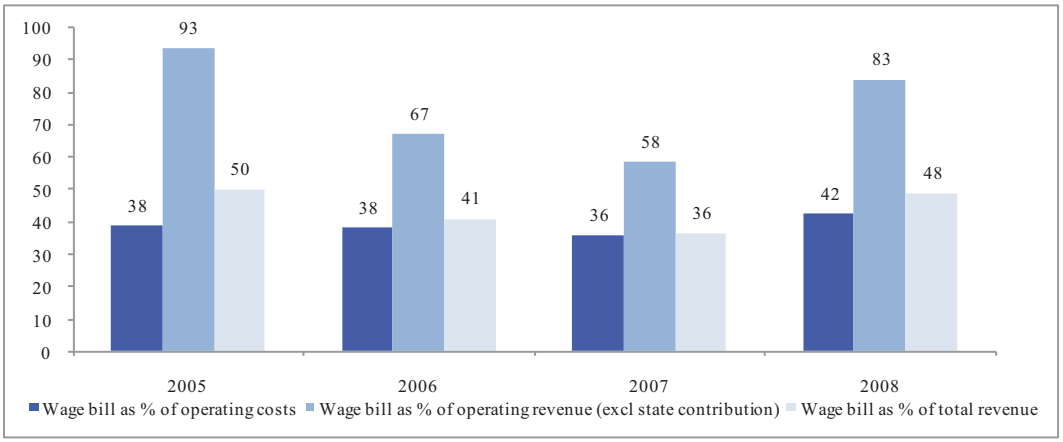
391. **Despite declines in staff levels, the wage bill as a share of operating costs has been rising and remains high.** The wage bill as a percentage of operating costs has risen from 38 percent in 2005 to 42 percent in 2008 (Figure 188). However, expressed as a percentage of operating revenue, excluding the state contribution, the wage bill stood at 83 percent in 2008, rising after having declined in 2006 and 2007. Part of the rise may be explained by the cost of severance payments aimed at reducing staffing levels. But, overall, the wage bill remains on the high side, despite the implementation in 2009 of a law on the temporary reductions of salaries and other benefits for the state administration and public sector helped contained the wage bill in 2009. Average wages in the company are significantly lower than the average in other Serbian public companies.[157]

392. **Average revenue per passenger km and per net ton km has improved over 2005-2008.** Figure 189 presents the average revenue per passenger km expressed in euro cents; for 2006-2008 average operating costs per passenger km exceeded average revenue per passenger km (excluding state subsidies) by a significant margin, although the gap narrowed in 2008. Passenger tariff

[157] In 2008 the net average wage at Serbian Railways was RSD27,770 (Euro 551), compared to RSD44,921 (Euro 341) for public enterprises.

policy is such that there could be scope for increased tariffs without reducing demand for services. In 2007, the Government approved a price increase in passenger tariffs of about 20 percent—the first such rise since 2004. Railway passenger tariffs remain lower than alternative transport modes, particularly buses. Serbian Railways calculates that bus transport prices, when compared to regular second class train prices, are about 70 to 150 percent higher—but with a much higher quality of service. Although there may be issues regarding reliability and quality of services on trains, there does appear to be scope for further price increases.

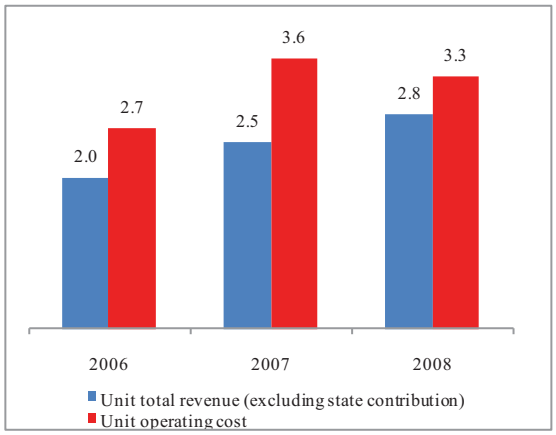
Figure 188: Serbian Railways Wage Bill Indicators



Source: Serbian Railways.

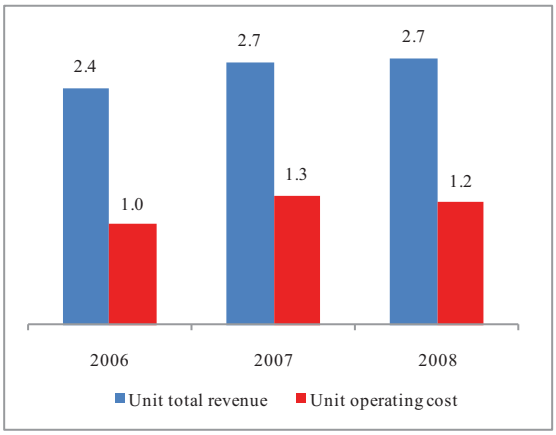
393. **Freight average revenues per net ton km increased over 2006-2008, and is more than twice the average cost.** Average revenues per net km rose from 2.4 euro cents per ton-km in 2006 to 2.7 euro cents per ton-km in 2008 (Figure 190). This is slightly lower than for passenger transport, but the costs are markedly lower. Whereas the average cost per passenger-km was 3.3 Euro cents in 2008, for freight average costs were 1.2 euro cents per ton-km, or 175 percent less. The very large difference is explained by the low and declining levels of passenger volume. In 2008, freight transport revenue reached Euro 109 million, while total expenses were only Euro 61 million. By contrast, passenger transport revenue in 2008 reached Euro 19 million, and total expenses were Euro 23 million.

Figure 189: ŽS – Average Revenue and Cost per Passenger Unit (Euro cents/pass-km)



Source: Serbian Railways.

Figure 190: ŽS – Average Revenue and Cost per Passenger Unit (euro cents/ton-km)



Source: Serbian Railways.

394. **Maintenance expenditure has been inadequate in the past, leading to increasingly aged and poor condition infrastructure and rolling stock**. One of the key elements when considering a medium-term maintenance plan is an analysis of line section profitability and a decision regarding a possible reduction of non-profitable services and network. A second important consideration is the decision on whether to bring existing lines up to original design speed or to raise speeds considerably above design levels, at significantly higher costs.[158] In 2007, infrastructure maintenance expenditures, at Euro 23 million, was only 63.3 percent of what was planned—and expenditures for maintenance for tracks and facilities on tracks reached only 25 percent of planned levels. Expenditures on infrastructure maintenance fell to Euro 7.9 million in 2009, down from Euro 15.1 million in 2008.[159] This is equal to only Euro 2,073 per km of network track. Current maintenance expenditures, *ceteris paribus*, will lead to increased deterioration of assets, with worsening service quality and increased risks of accidents.[160]

395. **Investments in rail infrastructure are considerably higher than expenditures on infrastructure maintenance**. Capital investments in infrastructure averaged Euro 14 million over 2005-2008, rising to Euro 33 million in 2009. This is equivalent to Euro 8,664 per km of the network (Figure 191) higher than in previous years. About 70 percent of investments for rehabilitation and modernization in 2009 were financed from proceeds of an EBRD credit for the Railway Rehabilitation Project II; Serbian Railways financed 13 percent; 4 percent was financed through grants; and 3 percent came from earmarked proceeds of the Ministry of Infrastructure. Because funds for investments are largely secured through credits from international financial institutions, they are more protected from the effects of the economic downturn than necessary infrastructure maintenance. However, reconstructing rail infrastructure is many times more expensive than maintaining it. The result is the accumulation of a maintenance backlog, a form of a contingent liability of future expenditure needs. Cutting capital expenditures is justified during periods of budgetary austerity, but reducing maintenance expenditures have to be compensated for in future years by much larger expenditures on rehabilitation and reconstruction. Under-investment in maintenance explains why the number of slow runs has increased from 201 to 273 over 2005-2009, and why it covers 490 km or 12.5 percent of the network in 2009, up from 326 km in 2005.

396. **As a share of GDP, budget operating subsidies to Serbian Railways have been declining this decade, but this trend was reversed in 2009.** Operating subsidies exceeded 1 percent of GDP in 2001, fell to 0.41 percent in 2008, and rose to 0.43 percent in 2009—in part reflecting the contraction of real GDP (Figure 192). However, the total state funds to Serbian Railways is higher, because they include compensation for indirect costs, revenue from the Fund for Development, proceeds from the Ministry of Infrastructure to pay for severance payments and other earmarked proceeds. Including these additional revenues, total state funds to Serbian

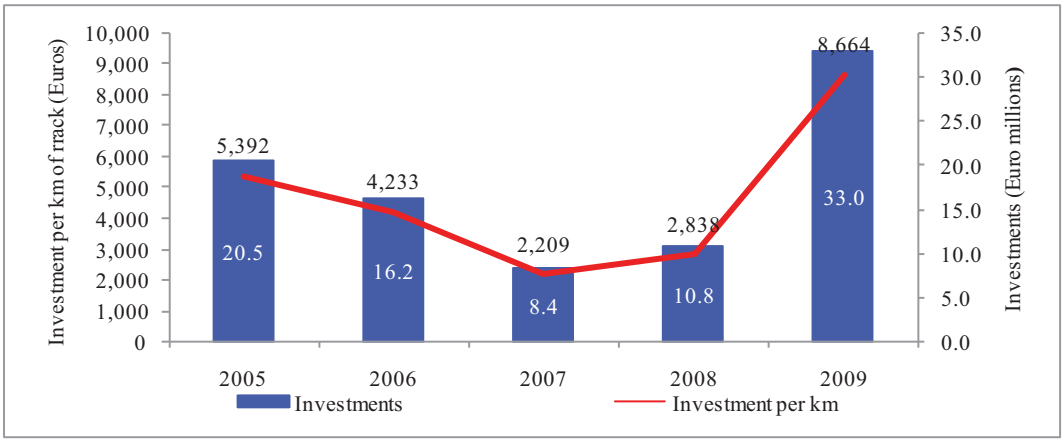
[158] Serbian Railways has calculated required maintenance—assuming the average overhaul of tracks on wooden sleepers is 20 years and track length of 3809 km, amounts to 190.5 km a year—while the annual average line overhaul over 2004-2008 was only 47 km a year, and is trending downward, creating an annual average backlog estimated at 149 km

[159] The decline was less severe in local currency, from RSD 742.7 million in 2009 to RSD 1,234 million in 2008.

[160] The number of accidents declined in 2009 to 11, from 27 in 2008, with 49 fatalities. The poor state of the infrastructure means that traffic speed restrictions are imposed on large segments of the network. Most fatalities and injuries are caused by third party negligence, but technical factors play an important part.

Railways reached Euro 138 million in 2008 or 0.41 percent of GDP; they rose to Euro 170 million—compared to Euro 134 million of operating subsidies—in 2009, equal to 0.55 percent of GDP.

Figure 191: Serbian Railways – Rail Infrastructure Investments, 2005-2008



Source: Serbian Railways.

397. **It will be difficult to reduce budgetary dependence, because there has been a need to maintain budget support levels due to the difficult financial position of Serbian Railways.** This is largely caused by the delay in financial consolidation, and by the cumulative effects of inadequate investments in railway capacities and the absence of charging for infrastructure. Until an infrastructure access charge regime is established, the budgetary subsidy will need to compensate the infrastructure manager, otherwise any reduction in subsidy is likely to translate into higher annual financial losses. At present the subsidy level is insufficient to cover the total cost of necessary infrastructure maintenance and passenger railway operations. A study has examined the effects of rationalization through a reduction in non-profitable services, and found that irrespective of the level of rationalization, the necessary subsidy substantially exceeds the available subsidy—which highlights the need to introduce an infrastructure access charge and a public service obligation regime. [161]

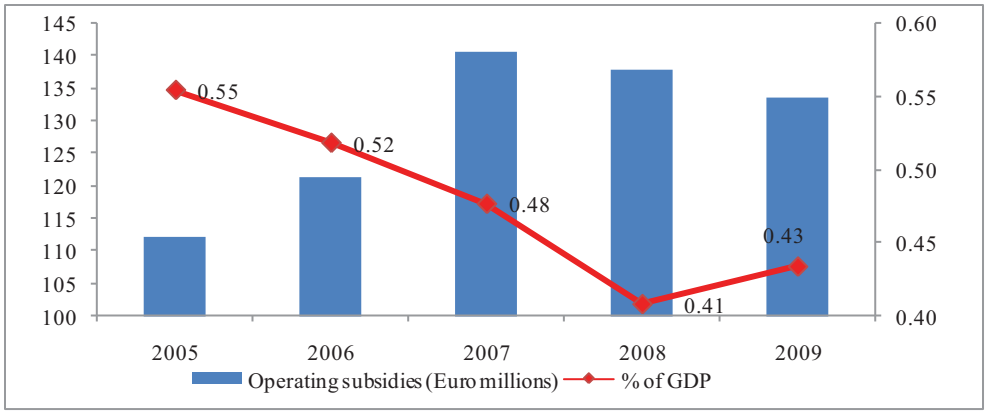
398. **In 2008, the government announced its plans to begin the modernization and reconstruction of the Corridor X rail line.** The stated objective is to raise speed in this corridor to 160 km/hour, which will require among other things, electrification and the construction of a second railway track on a number of sections.[162] The total value of the necessary investment is estimated at Euro 1.7 billion to Euro 2 billion, for total track length of 1,016 km. However, the cost could be considerably reduced if it was decided to have speeds of 120 km/hour or less, which would be more in keeping with the composition and level of current and projected traffic. All electrical-technical plants on all lines on Corridor X, with the exception of the Niš-Dimitrovgrad line, allow for speeds of 120 km/hour—and 55.4 percent of lines were designed with route elements for speeds of 120 km/hour. In other words, the lower speed objective would be more in line with the design speed of the existing infrastructure and would be considerably cheaper.

[161] Booz, Allen and Hamilton, *Designing an Infrastructure Access Regime and Network Statement for the Rail Sector in Serbia*, November 2007.

[162] The *National Road and Rail Infrastructure Development Plan for the Republic of Serbia for 2008-2012* sets out the road and rail infrastructure projects that are considered national priority objectives.

According to Serbian Railways own estimates, total superstructure and substructure costs are estimated at Euro 880,000 per track km for a speed of 120 km/hour, but rise sharply to Euro 2.12 million per track km for 160 km/hour.[163]

Figure 192: Serbian Railways Operating Subsidy, 2005-2009



Sources: Serbian Railways, IMF.

399. **In addition, the economic and financial case for increasing design speed on the infrastructure of Corridor X remains to be made**. A number of factors should be considered when making such a decision. These include: (i) the scale of the investments and associated expenditures; (ii) the cost differential of upgrading infrastructure from 120 km/hour versus 160 km/hour; (iii) the fact that freight traffic constitutes over 80 percent of total traffic and revenue—traffic that does not require speeds in excess of 100 km/hour; and (iv) the maintenance backlog on other parts of the railway network that will require upgrading over the medium to long-term. It appears necessary to assess alternative options in terms of the standard that would be consistent with the nature and scale of current and projected demand. Meanwhile, an agreement has been signed with Deutsche Bahn to prepare a master plan for the modernization of Corridor X, and this could review alternative design speeds. This master plan will be used as the basis to access EU funds for future investments in the sector.

400. **There is another option, which may even be preferable in the short-to-medium term, and would likely have higher economic returns.** This would be to defer large-scale investment to upgrade the rail infrastructure on Corridor X, and make necessary investments to address current speed restrictions and reduce the physical and institutional impediments at the border-crossings. The required measures include: (i) relocation of the change of locomotives for freight trains and the related train technical checks (brake testing) from border-crossing points to the nearest marshalling yard; (ii) implementation of IT solutions to facilitate advance processing by railways and border agencies; (iii) promotion of joint processing of freight trains by Customs administrations at inland terminals; and (iv) improvment of scheduling to build on the first three

[163] A comparison with the costs quoted by a railway company operating in the region suggests that these unit costs are on the high side, and may be applicable only to those parts of the infrastructure which are in the poorest condition. These alternative costs for scheduling a railway line overhaul for 1 km of track include €210,000 for materials, which is half of the cost quoted by Serbian Railways, and an additional €110,000 of labor costs.

points. The improvement in trade facilitation at the border is likely to have a greater impact on the operating speed of transit traffic for a modest cost, than significant investments in upgrading at this time. The more logical choice under the circumstances would appear to be: (i) implementing a program of investment to address all the speed restrictions; (ii) investing to return to the current design standard of 100 km/hour and 120 km/hour; and (iii) improving border-crossing times.