



## THE STRATEGY OF PASSENGER TRANSPORTATION BY NATIONAL RAILWAY TRANSPORT: THE IMPLEMENTATION OF PUBLIC SERVICE OBLIGATIONS

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**Abstract.** Based on research carried out by the author, the article identifies the problems of passenger transportation by national railway transport such as reduction in passenger flows, the growth of transportation costs, insufficient financing of loss-making transportation, unequal competition conditions for road transport, deficiencies of legal basis etc. Following the EU experience, passenger transportation by national railway transport is suggested to be developed. The author of the article puts forward suggestions regarding the formation of the strategy for implementing public service obligations, including the formation and implementation of public sector provisions as well as the concrete measures for railway transport.

**Keywords:** railway transport, passenger transportation, public service obligations, rolling-stock, route, passenger flows, infrastructure, profit, revenues, losses, financing.

### 1. Introduction

The local transportation of passengers by railways in Lithuania and the majority of countries worldwide is loss-making. However, practically in all EU member states as well as in other countries losses on local transportation are recovered by the national budget (Tolli and Laving 2007; Schach and Naumann 2007; Akgungor and Demirel 2007; Koppel 2006; Šakalys and Palšaitis 2006).

At present, passenger railway transport activities on local routes are loss-making in Lithuania.

With the aim of the approximation of the operational conditions of JSC *Lithuanian Railways* to the requirements of the European Union, in 2000, the restructuring of the Company was started. The management of JSC *Lithuanian Railways* will be decentralized. In 2006, 3 directorates were established: Freight Transportation Directorate, Passenger Transportation Directorate and Railway Infrastructure Management Directorate. Whereas at present, passenger transportation activity is mostly financed from the revenues received by freight transportation, the independent passenger transportation company will lose this source of financing and will not be able to continue its activities – Vasilis Vasiliauskas and Barysienė (2008).

Therefore, by implementing the organisation of public services, it is necessary to ensure the full financing of losses in local passenger transportation by rail. In line

with the order defined by the *Law on the Principles of the Activities of Transport*, the Government, or its authorised institution, shall make with the railway company (carrier) public service agreements indicating possible financing resources for investment programmes.

Only after the agreement is signed by the Government and passenger carriers, this activity will really become business activity. In this case, competition in passenger transport market will occur, i.e. the carrier, that will propose lower transportation costs and higher transportation quality, will win the tender and the State will buy its passenger transportation services. Thus, the State will economise finances and passengers will receive transportation conditions for higher quality – Butkevičius (2007).

### 2. Problems of Passenger Transportation by Railway Transport

Research carried out by the author revealed the main problems of passenger transportation by national transport.

#### Decrease in passenger flows

Dynamics of passenger amounts transported by local routes is given in Fig. 1.

The amounts of passengers carried by local routes within the period of 1996–2007 were constantly de-

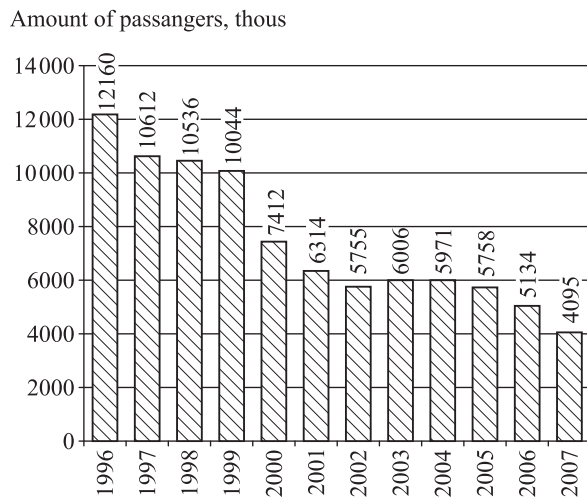


Fig. 1. Dynamics of passenger amounts transported by railways on local routes in 1996–2007, thousands of passengers

creasing as within this period, the amount decreased from 12 160 thousand passengers to 4 095 thousand passengers, i.e. by 2.97 times.

Passenger amounts in railways decrease due to various reasons. As in the whole Europe, the growth of household revenues, particularly in urban areas, invoked the growth of the amounts of private individual cars. With the growth of automobilisation rate, more people choose travelling by an individual car rather than by train.

Another reason is buses which as well as private individual cars are more comfortable not only for people living in regions but also for those commuting to work or study locations and living in quite remote distances (within or further than 15 min distance) from railway stations. In many cases, buses and certainly private individual cars ensure a shorter travel time in comparison with that of trains.

In any case, in the future, private individual cars and buses in Lithuania as well as throughout Europe will be the main competitors of railways in the suburban transportation of passengers.

**The growth of the costs of passenger transportation**

The costs of local transportation in railway transport are defined by the types of trains. The dynamics of these costs within the period of 2000–2006 are presented in Table 1.

From 2000 to 2006, the costs of 1 passenger kilometre (pas. km) of local passenger transportation grew by all types of trains – by diesel trains increased from LTL 0.32 to LTL 0.53764 (i.e. 1.68 times more), electric trains – from LTL 0.32 to LTL 0.42523 (i.e. by 1.38 times more), trailing wagons with heat traction – from LTL 0.35 to LTL 0.48295 (i.e. by 1.49 times more) (Table 1).

Also since 2000 to 2006, the costs of 1 wagon kilometre (wag.km) by diesel trains grew from LTL 4.27 to LTL 9.11717 (i.e. by 2.14 times more), electric trains – from LTL 4.43 to LTL 7.21107 (i.e. by 1.83 times more). The total costs of local passenger transportation grew from LTL 4.34 to LTL 8.33533 (even by 1.92 times more).

It should be noted that if the cost of local passenger transportation for 1 pas.km was the least by diesel trains (LTL 0.32) in 2000, so in 2006, the costs of this type of transportation reached the highest rate (LTL 0.53764). Analogically, in 2000, the cost of 1wag.km by diesel trains was the least (LTL 4.27), whereas in 2006, it became the highest one (LTL 9.11717).

**The growth of passenger transportation costs**

Costs are best reflected by the costs for one passenger kilometre. Fig. 2 shows the dynamics of costs for one passenger kilometre on local routes. As Fig. 2 illustrates, within the period of 1996–2002, the costs for one passenger kilometre grew from ct 17.73 to 48.91 ct, i.e. increased by even 2.76 times. In 2003, the costs de-

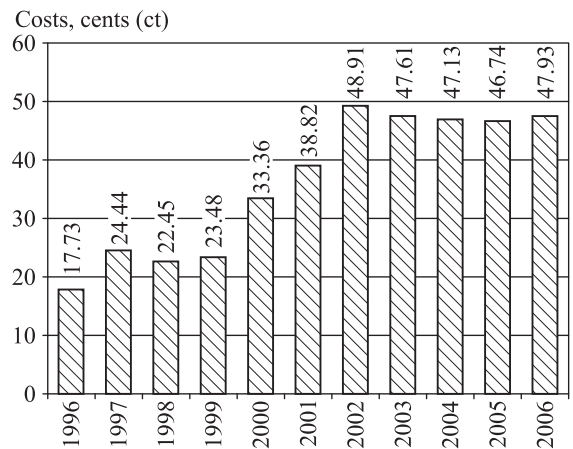


Fig. 2. Dynamics of costs for one passenger kilometre on local routes in 1996–2006, ct

Table 1. Costs of local transportation according to train types in 2000–2006

Types of transportation and trains	2000		2002		2004		2006	
	LTL /pas.km	LTL /wag.km	LTL /pas.km	LTL /wag.km	LTL /pas.km	LTL /wag.km	LTL /pas.km	LTL /wag.km
Local (in total);	0.33	4.34	0.48922	5.9155	0.47119	6.96600	0.49177	8.33533
Diesel trains	0.32	4.27	0.48069	5.8541	0.50562	7.50305	0.53764	9.11717
Electric trains	0.34	4.43	0.38504	4.6892	0.40403	5.99558	0.42523	7.21107
Trailing wagons with heat traction	0.35	4.47	0.58110	6.8989	0.46780	6.84497	0.48295	8.17589

creased to ct 47.61 and during the remaining three years, they were continually falling down and in 2006, made ct 47.93.

The main reason for an increase in costs during 1996–2002, was the growth of prices and wages.

### Decrease in tariff revenues

From 1996 to 2006, tariff revenues dropped from LTL 28 929.5 thousand to LTL 18 054.6 thousand, i.e. decreased by 1.6 times. It should be noted that tariff revenues were decreasing from the year 1996 to 2002 as during that period, they dropped from LTL 28 929.5 thousand to LTL 15 552.9 thousand, i.e. decreased even by 1.86 times. Since 2003, tariff revenues have started growing and until 2006 grew to LTL 18 054.6 thousand, i.e. by 1.16 during the discussed period.

### High infrastructure charges

Infrastructure charges in railway transport are considerable. In passenger transportation, approximately a third of costs comprise infrastructure costs which influences the growth of transportation costs, whereas there are no infrastructure charges for carriers in road transport.

### Insufficient financing of the loss-making transportation of passengers

During the period of 1996–2003, the transportation of passengers with reduced tickets totalled to LTL 20 544.8 thousand (apart from the extra allowance of LTL 3 249.6 thousand received in 2001).

In the period from 2000 to 2004, budget finances were not allocated for passenger transportation at all.

Passenger transportation was insufficiently financed by the State in the period from 1996 to 2003 as within the whole period, it was planned to allocate LTL 109 861 thousand, however only LTL 90 335.7 thousand were allocated, so the undischarged sum was LTL 19 527.43 thousand see Butkevičius (2008).

### Unequal conditions of competition with road transport

Research has revealed an important fact showing that Lithuanian road transport has two important priorities in competition with railway transport. Lithuanian carriers pay for roads via the excise duty of gasoline and diesel fuel. However, while buying diesel fuel *Lithuanian Railways* also pay excise duty, thus every year, they finance road transport by tens of millions litas (LTL). Therefore, they indirectly finance their own competitor – road transport.

*Lithuanian railways* themselves modernize and maintain the national railway network (owned by the Government) using EU funding and other resources. However, the automobile road network belongs to the State constructing, developing and maintaining roads. The existing situation is not satisfactory as unfair competition occurs between road and railway transport – Butkevičius (2008).

### Shortcomings of legal basis/system

The compensation order for passenger transportation losses caused by the delivery of necessary passenger transport services exist in road transport only.

Meanwhile, in railway transport, this order is not legally enacted. Therefore, it should be reasonable to prepare and legally enact the *Order of the compensation of losses caused to carriers in passenger railway transportation due to the delivery of public railway transport services*, i. e. the order analogous to that imposed on road transport.

### 3. Experience of the EU member states

The experience of the EU member states shows that:

- local passenger transportation by rail is oriented to the travels of people having lower income;
- local passenger transportation is not intended for gaining profits from activity and the activity itself is regarded as the social obligation of the State to people;
- in many countries, tenders are published for arranging such transportation;
- such transportation is based on public service agreements,
- the losses of such transportation are fully covered from the budgets of States or Districts (as in Poland) with a partial support from local institutions (France) – Butkevičius (2008); Reforming Europe's Railways... (2005); Asmild *et al.* (2008).

### 4. The Policy of the European Union

Until 2020, in Europe it is intended to (White book (2001):

- increase the market share of railways in the field of passenger transportation from 6% to 10% and in freight transportation – from 8% to 15%;
- reduce exhaust pollution by 50%.

It is obvious that the EU enhances the regeneration of railways and intends to increase considerably the market proportions falling to railways in freight and passenger transportation. Thus, following the EU transport policy, it is also necessary to develop railway transport in Lithuania.

### 5. The Strategy of Implementing Public Service Obligations

On the basis of this research, the author proposes the following primary measures for the formation of a strategy for public service obligations:

#### Formation and implementation of State/public provisions

- Implementing complex measures for the solution of national passenger transport problems;
- Developing passenger transportation in accordance with scientific research, thus ensuring the most efficient use of finances;

- Developing national public transport in view of a rapid growth of automobilisation together with its increasing negative consequences such as traffic accidents, atmosphere pollution, noise emission, congestions, etc.;
- Stimulating the development of passenger transportation by railway as the safest, ecological and powerful mode of transport;
- Legal and economic stimulation of passenger transportation by railways;
- Using the advantages of railway transport against other transport modes in the passenger transportation market;
- Regarding passenger transportation by rail not as the resource of profit but also as social public service provided to society, thus enabling to satisfy the demands of population for local railway transport;
- Discontinuing the cross-financing of loss-making passenger transport;
- Organizing passenger railway transportation on a tendering basis;
- Contracting tender winners for public service agreements;
- Full coverage of losses for passenger transportation to carriers contracted by public service agreements, including the profitability necessary for the renewal of rolling-stock pool by necessary allocations;
- Ensuring equal conditions for competition between road and railway transport;
- Making solution to problems related to fuel excise duty in railway transport;
- Supplanting illegal carriers in road transport;
- Equalising the conditions of infrastructure charging in railway and road transport;
- Coordinating routes between railway and road transport (so as to avoid the redundancy of route timetables in issuing permits for service delivery to long-distance road transport routes);
- Establishing the unified railway and road transport system in passenger transportation;
- Forming the unified information system for passengers regarding transportation by road and rail;
- Implementing unified tickets in railway transport, suburban transport and urban road transport.

### Renovation of rolling-stock pool

- To renovate rolling-stock until 2013, the investment of LTL 643 million is required from which the sum of LTL 593 million for purchasing new rolling-stock and LTL 40 million for modernisation of the existing rolling-stock;
- Until 2027, it is necessary to replace and modernise 173 rolling-stock units. For this purpose, LTL 991.5 million should be invested. Within the period of 2008–2013, it is planned to:
  - modernise 2 electric trains,

- modernise 1 diesel train,
- purchase 11 electric trains,
- purchase 13 diesel trains,
- purchase 33 passenger carriages,
- purchase 2 railcars.

The carried out research has demonstrated that on many local railway routes, passenger flows are inconsiderable as diesel trains are filled up to 25% of passengers which makes very uneconomical use 4 wagon diesel trains on such routes.

Therefore, on the basis of the presented results of research, for cutting operational costs it is suggested to use railcars on un-intensive passenger routes.

Railcars are more compact and require fewer costs in comparison with diesel trains. The principles of railcar use are as follows:

- railcars are best used on short-distance lines, i.e. for transportation on the distance up to 50–100 km. Thus, they should be very useful for suburban transportation around the major towns of Lithuania – Vilnius, Kaunas, Klaipėda and Šiauliai;
- it is reasonable to use railcars on the stretches with un-intensive or very uneven passenger flows where diesel train operation may be loss-making.

### Improving transportation technologies

- A) A new method which is the implementation of high-speed local transportation ‘railway + bus’ is proposed for improving transportation technology as well as for better railway and road transport interoperability.

On the routes Vilnius–Kaunas, Kaunas–Klaipėda, Vilnius–Varėna, Vilnius–Turmantas, the main passenger flows should be carried by high-speed trains and local bus transportation should be adjusted to railway transport, thus enabling the fluent transportation of passengers within the region.

This needs an increase in the speed of passenger trains. Furthermore, it is very important that regional bus traffic should be smoothly adjusted to the traffic of trains on those routes.

- B) Aiming at the optimum organisation of national local passenger transportation by road and railway transport, it is necessary to implement one more principle which is the formation of a logical trip chain ‘travel + change/commute’.

On the basis of research, it is proposed to coordinate:

- the traffic timetables of intercity bus and railway routes with regional bus timetables as well as the routes for changing transport modes and commuting;
- the coordination of railway traffic with regional bus timetables (and these adjusted to railway timetables).

According to the above-mentioned coordinated timetables of railway and bus traffic, it is necessary to arrange for passengers the entire logical travel chain ‘travel + change/commute’ within the whole country.



It is recommended to issue for passengers a general booklet of bus and railway traffic timetables. The booklet should indicate changing from suburban buses to intercity trains and vice versa as well as changing from intercity buses and trains to suburban buses and vice versa. Such indicative visual information should be also provided in bus and railway stations.

- C) One more method for improving passenger transportation technology and making railway and road transport interoperability is proposed. The method embraces the arrangement of combined transportation 'railway + bus'. It is proposed to arrange combined 'railway + bus' passenger transportation by the route Vilnius – Kretinga–(Palanga, by bus)–Klaipėda.

On this route, passengers should change from trains to buses for operation cost efficiency reasons. Analogically, passengers should be transported to trains changing to the mode of bus transportation. It is reasonable to make the unified ticket for such transportation and revenues from the sold tickets should be divided between carriers according to defined regulations.

On the basis of the author's research, a high-speed train 'Baltija' was launched in 1994 between Vilnius and Klaipėda. Afterwards, in 1995, a high-speed train 'Pajūris' was introduced. At present, both trains carry the most considerable amounts of passengers in Lithuania. So, the passengers are able to go from Vilnius to Klaipėda and back within one day (and vice versa) thus being able to save their time and money. However, the conducted research has shown that Kaunas citizens do not use the service of this train. It is therefore reasonable to arrange passenger transportation from Kaunas to Jonava where trains 'Baltija' and 'Pajūris' arrive and to carry passengers from Jonava railway station back to Kaunas. Furthermore, it is proposed to carry the passengers of the trains 'Baltija' and 'Pajūris' from Kretinga by bus to Palanga and back to Kretinga, thus enabling the passengers commute to/from the main resort locations of Palanga.

The implementation of the above mentioned principles of transport technologies should considerably improve passenger transportation by rail and by bus, thus enabling the growth of passenger flows in public transport as well as an increase in revenues from passenger transportation.

### **Modernisation of railway infrastructure**

The main infrastructure project related to passenger transportation is an increase in speed up to 160 km/h on Vilnius – Kaunas line. This project will consist of three components:

- road reconstruction (upper-layer construction, subgrade and bed),
- modernisation of contact network,
- modernisation of signalling equipment.

It should be noted that the implementation of this project comprises not only passenger transportation but also freight transportation as the speed of freight trains will increase up to 120 km/h, the volume – to 6 000 t.

### **Increase in trip frequencies on certain routes**

With the view to attract the larger flows of passengers and thus strengthen the market position of passenger transportation, it is reasonable in perspective to increase the frequency of trips on the following routes:

- Vilnius–Kaunas route – from 14 to 20–22 trips per day;
- Vilnius–Klaipėda route – trains 'Baltija' and 'Pajūris' from 2 to 3 trips per day;
- Vilnius–Trakai route – from 8 to 12 trips;
- Vilnius–Valčiūnai–Stasylos section – from 5 to 7 trips;
- Vilnius–Ignalina–Turmantas section – from 7 to 10 trips;
- Vilnius–Rūdiškės–Varėna–Marcinkonys section – from 6 to 8 trips, etc.

### **Increase in travel speed**

Increasing travelling speed is particularly important to the routes Vilnius–Kaunas, Kaunas–Klaipėda.

Almost 75 % of passengers travel by rail between minor stations and 25 % of those between major towns. An increase in travel speed in many cases will be useful to passengers travelling by longer distances, i. e. between major towns. Thus, for attracting passengers to travel longer distances, it is necessary to heighten the speed of transportation.

It should be noted that the implementation of the two above-mentioned measures – an increase in trip frequencies and travel speed – is also useful economically because the costs of railway company (carrier) recede considerably for each train kilometre (as well as for passenger kilometre) due to relatively high stable costs (rolling-stock, infrastructure etc.).

### **Extension of routes**

This is primarily related to Klaipėda region.

On the basis of research, it should be reasonable to analyse the expedience of the revival of the cancelled routes in Klaipėda, Kaunas and Šiauliai regions as well as the intensification of their frequency. This is mostly related to the routes Klaipėda–Pagėgiai, Jonava–Kaunas and Šiauliai–Mažeikiai.

### **The implementation of ticketing and booking systems together with the implementation of a joint electronic ticket for railway and public urban transport**

### **The enhancement of flexible tariff policy and cost effective competition with other transport modes**

### **The improvement of the ticketing system**

In local transportation, it is important to extend the spectrum of discounts and reduction actions enabling to attract the passengers of different categories.

### Constant optimisation of the timetables of passenger train traffic

This should be done in line with research on passenger flows, passenger opinion polls and changes in the passenger transport market, i.e. regarding the operation of competitive transport modes, particularly road transport operation.

### Coordination of traffic timetables

Constant coordination is necessary for traffic time-tables of different routes, so that passengers should have good opportunities for changing trains without considerable time losses.

### Improving the information system for passengers

The adjustment of passenger rolling-stock and equipment for stations adapted for disabled passengers or people with limited mobility

The implementation of the above discussed measures will have the following positive results:

- the growth of passenger flows at railway transport;
- at the same time, revenues from passenger transportation will increase;
- operational costs will decrease;
- less state allocations will be needed for financing loss-making passenger transportation;
- the competitive ability of railway transport will increase considerably in the passenger transport market;
- passenger transportation conditions will improve;
- travel time will be reduced;
- comfort will be enhanced;
- passengers will be provided with all transport logistics services.

### 6. Conclusions

1. Local passenger transportation by rail is loss-making in Lithuania and worldwide. However, local transportation losses are financed from the State budget practically in all EU member states as well as in other countries.
2. With the view of the approximation of activity conditions for JSC *Lithuanian Railways* to the requirements of the European Union, in the year 2000, the restructuring of the company was started. The management of JSC *Lithuanian Railways* will be decentralised. In 2006, 3 directorates were established, including Freight Transportation Directorate, Passenger Transportation Directorate and Railway Infrastructure Management Directorate. Whereas at present, passenger transportation activities are financed mostly from freight transportation revenues, the independent passenger transportation enterprise will lose this resource of financing and will not be able to continue its activities.
3. Within the period from 1996 to 2007, the amounts of passengers carried by local routes were constantly decreasing and the figures from 12159.8 thousand passengers fell down to 4 095.2 thousand passengers, i.e. by 2.97 times.
4. Railway transport is related to high infrastructure charging. In passenger transportation, one third of costs fall to infrastructure costs, thus influencing the growth of freight transportation, whereas in road transport, carriers are not liable to infrastructure charges.
5. In the period from 1996 to 2003, the total sum of uncovered losses caused by the transportation of passengers by reduced tariffs reached LTL 20 544.8 thousand (apart from LTL 3 249.6 thousand extra allowance in 2001). During the period of 2000–2004, budget funding for passenger transportation was not allocated at all. Within the period from 1996 to 2003, passenger transportation was not sufficiently financed by the State as then, it was planned to allocate LTL 109 861 thousand. However, only LTL 90 335.7 thousand were allocated, so the deficient amount at that period made LTL 19527.43 thousand.
6. Research has revealed that road transport has two priorities in competition with railway transport in Lithuania. Lithuanian carriers pay for roads through gasoline or diesel fuel excise duty. However *Lithuanian Railways*, while buying diesel fuel also pay excise duty and thus every year finance road transport by tens of millions LTL which means in this way, they indirectly finance their main competitor, i. e. road transport.
7. *Lithuanian Railways* invest their own efforts to modernise and maintain the national railway network (owned by the Government) using the EU funding and other resources. At the same time, the road transport network belongs to the State constructing, developing and maintaining roads. Such situation is not favourable because of unequal conditions for competition between road and railway transport.
8. Compensation order for covering losses caused to passenger transport carriers by the necessary delivery of passenger transportation services using road transport is enforced in road transport only. Meanwhile, in railway transport, such compensation order is not legally enforced. Therefore, it is reasonable to prepare and legally enforce the *Order of the compensation of losses caused to carriers in passenger railway transportation due to the delivery of public railway transport services*, i. e. a similar document applied for road transport.
9. The experience of the EU member states shows that local transportation activities are non-profit activities and are approached as social public obligation of the State. Furthermore, losses caused by this transportation are fully covered from the budgets of States or Districts (for example, in Poland).
10. The article presents the strategy of implementing public service obligations prepared by the author. The main measures of the strategy are:
  - the formation and implementation of national public provisions,

- the renovation of rolling-stock pool,
  - improvement in transportation technology,
  - the modernisation of railway infrastructure,
  - the intensification of travel speed,
  - the extension of routes, etc.
11. For the development of passenger transportation by railway transport it is necessary to:
- discontinue the loss-making cross-financing of passenger transportation,
  - organise tendering for passenger transportation,
  - fully cover losses suffered by carriers due to public service agreements etc.

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