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# REPORT

## QUALITY ANALYSIS OF THE PUBLIC TRANSPORT SYSTEMS

 **INTER  
CONNECT**

**One ticket to the future**



European  
Regional  
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Fund

# REPORT

## QUALITY ANALYSIS OF THE PUBLIC TRANSPORT SYSTEMS

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# INTRODUCTION

**THE EU STRATEGY** for the South Baltic Sea region (EUSBSR) flagship project INTERCONNECT Table of Contents addresses the challenge of curbing the car-reliant mobility trend in the South Baltic area through user-adjusted and more sustainable public transport services for regional and cross-border travels.

This report is the result of Activity 4.1 Quality analysis of the public transport systems: Blekinge, Pomorskie, Klaipeda area, Guldborgsund, Rostock, and Viimsi (Helsinki – Tallinn area). The information has been compiled under questionnaires prepared by InnoBaltica, completed by the partners of analysed areas, available literature and experiences from study visits.

As a compilation of the quality strengths and deficits of the PT systems in the analysed area, the report will constitute background material (input) for wider discussion during INTERCONNECT benchmark seminar. The result of the seminar - Seminar Report reviewed by all INTERCONNECT Partners including agreed benchmarks for replication between the public transport systems in the partner areas in the South Baltic - will be the final deliverable 4.1 of INTERCONNECT project.



# OBJECTIVES OF INTERCONNECT PROJECT

**INTERCONNECT** addresses the opportunity of curbing the car-reliant mobility trend in the South Baltic area by means of user-adjusted and more sustainable public transport services for regional and crossborder travels.

**INTERCONNECT** supports new and more efficient public transport services both in and between the coastal regions of the South Baltic area - to give the residents and tourists broader and more sustainable options for realising their mobility needs.

## 6 MAIN BENEFITS OF PROJECT INTERCONNECT:

- The integrated passenger information and ticketing system
- Delivering know-how and planning tools
- New solution for Pomorskie and Blekinge
- Better services in Klaipeda
- Cooperation across the German-Danish border
- Better quality of life in the South Baltic area

## MAIN PROJECT FEATURES:

- 20 formal and associated partners from 6 countries
- Geography: South Baltic area (coastal regions of five EU Member States: Germany, Denmark, Sweden, Lithuania and Poland)
- Total budget of the project: 3,46 million EUR
- Duration of the project: 36 months (June 2017 – May 2020)

For more information please visit the website at: <http://interconnect.one>

# THE CONCEPT OF PUBLIC TRANSPORT AND ITS QUALITY

By definition, public transport is “a system of vehicles such as buses and trains that operate at regular times on fixed routes and are used by the public”<sup>1</sup>. The four basic aims of public transport operation include:

- provide access to employment, education, retail, health, recreational facilities, etc.
- ensuring the possibility to travel for all inhabitants who cannot or do not want to use private cars;
- providing travels compared to which the use of private car is ineffective for economic, time-based or ecological reasons;
- being the actual alternative to private car.

Public transport services can be rendered, inter alia, by the following:

- road vehicles: : bus, trolleybus, paratransit service, vanpool services;
- rail vehicles: heavy rail, commuter rail, tram, underground;
- vehicles using “other fixed guideways”: cable car, monorail, automated guideway transit;
- water-borne vehicles: passenger-only and vehicle ferries, water taxis.

All of these vehicles differ from each other in operational characteristics (table 1). Thereby, the majority of public transport systems use more than one type of vehicles, which helps to achieve synergy effect. The characteristics of public transport vehicles is also determined by the distance of travel they need to cover. Because of the distance or operational area, public transport can be divided into local (urban), regional, national and international transport.

<sup>1</sup> Cambridge Dictionary, [www.dictionary.cambridge.org](http://www.dictionary.cambridge.org), (access: 02.04.2018)

	Capacity	Passengers per vehicle (average)	Corridors (passengers per hour per direction)	Trip distance (average)	Cost of service expansion	Flexibility
<b>Metro</b>	high	65-75 seated 100-120 total	25000	>1 km	very high	low
<b>Heavy rail</b>	high	65-75 seated 100-120 total	25000	>5 km	very high	low
<b>Light rail</b>	medium-high	40-80 seated 180 total	3600	>1 km	high	low
<b>BRT</b> (bus rapid transit)	medium	60 seated 100-110 total	1900-2100	>1 km	medium	medium
<b>Capacity</b>	medium	40-60 seated 60-105 total	1200-1400	>500 m	medium	medium

**Table 1.** Operational features of selected public transport means

At present, 75% of the EU inhabitants are people living in cities<sup>2</sup>. All cities which rank top from the perspective of the inhabitants' quality of life treat public and non-motorised transport as a matter of priority and try to reduce the share of private vehicles in daily travels of their inhabitants.

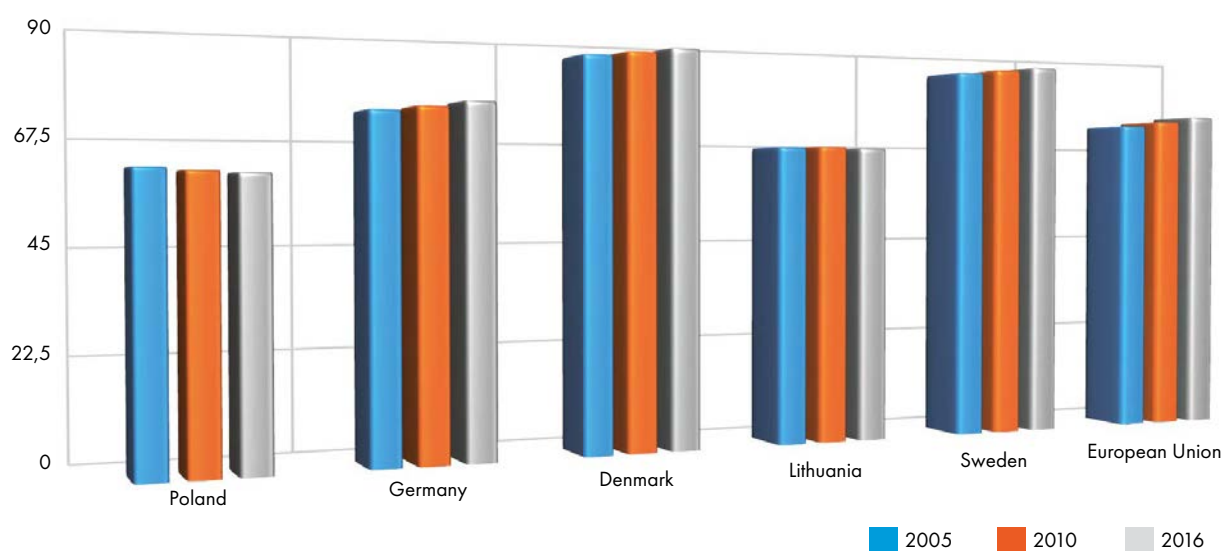
The countries which participate in the **INTERCONNECT** project and stand out against the European average relative to the percentage of inhabitants living in cities include Denmark and Sweden. In these countries, such inhabitants constitute 88% and 86% of the total population (figure 1) respectively<sup>3</sup>.

<sup>2</sup> World Bank Data, [www.databank.worldbank.org](http://www.databank.worldbank.org), (access: 02.04.2018)

<sup>3</sup> Chapter 4 - sustainable urban transport [in] Shanghai Manual A Guide for Sustainable Urban Development in the 21st Century, United Nations, p. 1.







**Figure 1.** The scale of urbanization of countries participating in the INTERCONNECT project  
 Source: [databank.worldbank.org](http://databank.worldbank.org)

Every year, in the European Union nearly 60 billion travels are performed by means of public transport<sup>4</sup>. It means that the average inhabitant of the EU performs ca. 150 travels by public transport annually. At the same time, only 19% of all Europeans claim they use public transport on a regular basis<sup>5</sup>. According to research conducted in countries analysed in this report we can observe various trends in the volume of reported demand per capita for public transport services. In Poland and Denmark the demand has been decreasing, whereas in Germany, Sweden, Lithuania and Estonia it has been increasing<sup>6</sup>.

<sup>4</sup> Statistics Brief. Local public transport in the European Union, UITP, 2016, p. 1.

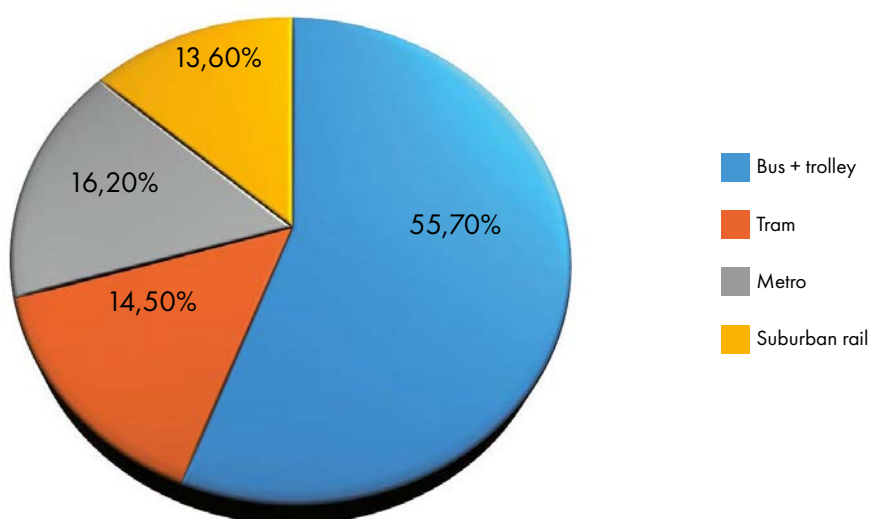
<sup>5</sup> Special Eurobarometer 422a, Quality Of Transport Report, 2014, p. 5, [www.data.europa.eu](http://www.data.europa.eu), (access: 12.04.2018)

<sup>6</sup> Statistics Brief. Local public transport in the European Union, UITP, 2016, p. 3.





The mode of public transport most frequently used in Europe includes buses and trolleybuses (figure 2). They are used by the EU inhabitants in ca. 56% of all travels by public transport.



**Figure 2.** Local public transport journeys in the EU-28, broken down by mode

Source: Statistics Brief. Local public transport in the european union, UITP, 2016, p. 1.

One of the key factors affecting the volume of reported demand for public transport services is their quality. The quality of public transport systems can be perceived by users from various perspectives, including<sup>7</sup>:

- Availability (when and where transit service is available), and coverage (the portion of geographic area, or the portion of common destinations in a community, located within reasonable distance of transit service).
- Frequency (how many trips are made each hour or day).
- Travel speed (absolute and relative to automobile travel).
- Reliability (how frequently service follows published schedules).

<sup>7</sup> T. Litman Evaluating Public Transit Benefits and Costs, Best Practices Guidebook, Victoria Transport Policy Institute, 2017

- Integration (ease of transferring within the transit system and with other travel modes).
- Price structure and payment options.
- User comfort and security, including riding on, walking to, and waiting for transit.
- Accessibility (ease of reaching transit stations and stops, particularly by walking).
- Universal design (ability to accommodate diverse users including people with disabilities, baggage, inability to understand local languages, etc.).
- Affordability (user costs relative to their income and other travel options).
- Information (ease of obtaining information about transit services).
- Aesthetics (appearance of transit vehicles, stations, waiting areas and documents).
- Amenity (extra features and services that enhance user comfort and enjoyment).

To make public transport services more attractive and thereby reduce the car use, regions as well as public transport companies could ensure high quality of service of public transport system, amongst others, by implementing the following measures<sup>8</sup>:

- Widening and simplifying the public transport network;
- Modernising infrastructure (especially at intermodal interchanges) and making the entire voyage by public transport more comfortable;
- Enhancing the accessibility for all persons, especially for people with special needs; [www.interconnect.one](http://www.interconnect.one);
- Improving safety and security at stations, stops and at vehicles for passengers and drivers, as well as for infrastructural equipment;
- Collect more precise and detailed information of the actual transport needs among the citizens and provide efforts to serve the actual concrete transport needs.

<sup>8</sup> Enhancing the quality of public transport services. Making public transport more attractive for citizens, CIVITAS Secretariat C/o The Regional Environmental Center for Central and Eastern Europe (REC), 2010

Despite activities implemented in the EU, (activities such as: providing funding through especially through the European Structural and Investment funds, creating conditions for cooperation between key stakeholders for exchange of learnings and support, promoting the exchange of best practice for example through the ELTIS portal, conducting studies on specific topics) aiming at improving the quality of public transport services, some transport issues still persist. The reasons for significant part of transport issues, particularly incities, include<sup>9</sup>:

- Unrestricted individual behaviour collides with socially optimal behaviour.
- There is a divergence between the immediate gratification of travellers and the larger longrange solution to transportation issues.
- Transportation has major social, environmental, and other positive and negative side effects. However, many of these external costs are not reflected in the charges paid by users for transportation service.
- The structure and distribution of transportation costs between users and nonusers (private sector, government, and society in general) vary greatly among modes.
- Inadequate understanding of these complex problems in transportation, compounded by the strong pressures exerted by special-interest groups, are serious obstacles to solutions that would serve the public good.

<sup>9</sup> V. Vuchic, *Transportation for Livable Cities*, Rutgers, New York 1999, p. XVII-XVIII.

## WHY IS PUBLIC TRANSPORT IMPORTANT?

The offer of public transport, its quality and share in modal split affect the EU inhabitants' quality of life. The reduction in the number of travels by private cars contributes to limiting the costs of congestion, volume of emitted noise and air pollution as well as the number of road accidents.

REDUCTION OF POLLUTION	REDUCTION OF ROAD CONGESTION	REDUCTION OF HOUSEHOLD EXPENSES
SAVING OF SPACE	SUSTAINABLE DEVELOPMENT	SAVING OF FUELS (ENERGY SOURCES)
REDUCTION OF NOISE	IMPROVED SAFETY	IMPROVED CONDITIONS FOR CITY DEVELOPMENT

**Figure 3.** Positive effects resulting from increased share of public transport in inhabitants' travels

Source: own elaboration



## IMPROVED SAFETY

**"The average EU fatality rate for 2017 was 49 road deaths per 1 million inhabitants, which is the lowest ever in EU history. It is also the lowest in the world"<sup>10</sup>**

Even though we can observe the improved safety on roads in all regions under analysis (the number of fatalities as well as injuries is decreasing), public transport is still perceived as much safer compared to individual transport. It is estimated that travels by public transport are ten times safer than travels by private cars<sup>11</sup>. It means that by giving up travels by private car, the user of public transport reduces the risk of being involved in a car accident by 90%.

**Table 2. Number of fatalities and injuries in road accidents in regions under analysis [NUTS2]**

Source: Eurostat, [www.ec.europa.eu/eurostat](http://www.ec.europa.eu/eurostat)

KILLED					
	2005	2010	2016	2005-2016 %	2010-2016 %
Sjælland	n.d.	44	37	n.d.	84%
MecklenburgVorpommern	198	108	89	45%	82%
Estonia	170	79	71	42%	90%
Lithuania	773	79	71	25%	64%
Pomorskie	266	198	144	54%	73%
Sydsverige	66	37	29	44%	78%

<sup>10</sup> EU transport commissioner Violeta Bulc, [www.euobserver.com/health/141564](http://www.euobserver.com/health/141564), (access: 02.05.2018).

<sup>11</sup> 2017 Public Transportatio Fact Book 68th Edition, American Public Transportation Association, March 2018.

INJURED					
	2005	2010	2016	2005-2016 %	2010-2016 %
<b>Sjælland</b>	n.d.	460	424	n.d.	92%
<b>MecklenburgVorpommern</b>	9368	6692	7134	76%	107%
<b>Estonia</b>	3027	1720	1458	48%	85%
<b>Lithuania</b>	8467	4230	3768	45%	89%
<b>Pomorskie</b>	4044	3406	3357	83%	99%
<b>Sydsverige</b>	4448	3985	3331	75%	84%

Air pollution is the most frequent cause of death of the EU inhabitants related to the condition of natural environment. Due to air pollution, up to 406 thousand premature deaths are reported, which constitutes over 10 times more deaths than those caused by road accidents<sup>12</sup>.

The European Commission estimates, depending on the assumed methodology, that the costs of air pollution amount from 330 to 940 billion euro annually. The costs result not only from deteriorated of health condition of people directly exposed to pollution and their hospitalization, but also from economic losses. It is estimated that air pollution generates losses of at least 100 million man-days within the European Union<sup>13</sup>.

From among all sources of air pollution, transport is indicated as the main emitter in cities; it is responsible for nearly one fourth of greenhouse gas emissions in Europe<sup>14</sup>.

The average emission level of a new car sold in 2017 was 118.5 grams of CO<sub>2</sub> per kilometre (158.7 grams in 2007)<sup>15</sup>. Taking into account the average mileage of private cars in the EU (ca. 12 thou. km)<sup>16</sup> it means that the average private car emits ca. 1 422 km CO<sub>2</sub> annually. Thanks to improved efficiency, public transport emits definitely less pollution compared to private cars per passenger-kilometre.

<sup>12</sup> Commission Staff Working Document, Impact Assessment — Accompanying the Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions — a Clean Air Programme for Europe, European Commission, Brussel 2013, p. 18.

<sup>13</sup> *Ibidem*.

<sup>14</sup> A European Strategy for Low-Emission Mobility, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Brussels 2016, p. 2.

<sup>15</sup> Reducing CO<sub>2</sub> emissions from passenger cars, [www.ec.europa.eu/clima/policies/transport/vehicles/cars\\_en](http://www.ec.europa.eu/clima/policies/transport/vehicles/cars_en), (access: 20.06.2018).

<sup>16</sup> Change in distance travelled by car, [www.odyssee-mure.eu](http://www.odyssee-mure.eu), (access: 20.06.2018).

## REDUCTION OF NOISE

Apart from air pollution, another factor related to transport which adversely affects the health and quality of life of the EU inhabitants is noise<sup>17</sup>. It is estimated that 125 million inhabitants in the European Union are exposed to noise of over 55 dB<sup>18</sup>, of which 37 million are exposed to noise of over 65 dB. According to the World Health Organization, noise of over 55dB during the day and 45dB at night becomes detrimental to human health<sup>19</sup>. Since recommended standards are permanently exceeded, noise within the European Union is responsible every year for<sup>20</sup>:

- 10 thousand premature deaths,
- state of irritation among 20 million inhabitants and sleep disorder among 8 million inhabitants,
- 900 thousand cases of hypertension,
- 43 thousand people hospitalized.

<sup>17</sup> J. Fossen, W. Kropp, T. Kihlman, *Introduction to traffic noise abatement*, [in:] *Environmental Methods for Transport*

<sup>18</sup> *Noise in Europe 2014*, European Environment Agency, Luxembourg 2014, p. 18.

<sup>19</sup> *Guidelines for community noise*, pod red. B. Berglund, T. Lindvall, D. H. Shwela, World Health Organization, Geneva 1999, Geneva 1999, p. III-XII

<sup>20</sup> *Noise in Europe 2014...*, p. 5.



## REDUCTION OF ROAD CONGESTION

Despite continuous infrastructure investments the congestion is becoming more and more serious problem in urban and suburban areas of the EU countries. It is estimated that congestion is responsible for losses reaching 1.1% GDP of EU-28 countries, including Switzerland and Norway<sup>21</sup>. Among countries subject to analysis in this report, Germany bears the biggest costs of congestion in terms of value, whereas Poland the biggest in terms of share in GDP (table 3).

**Table 3. Yearly total congestion cost per country (passengers)**

Source: Study on Urban Mobility – Assessing and improving the accessibility of urban areas, Annexe 2: Task 2 Report – Estimation of European Urban Road Congestion Costs, European Union, 2017

Country	Yearly total congestion cost (million Euro/year)	Share of GDP (%)	Yearly interurban delay cost (million Euro/year)	Yearly urban delay cost (million Euro/year)
Denmark	1,327	0.57%	462	865
Estonia	196	1.21%	15	181
Germany	20,904	0.80%	2504	18,4
Lithuania	401	1.30%	61	640
Norway	1,473	0.55%	98	1,375
Poland	6,402	1.73%	1945	4,457

According to ranking conducted by INRIX Research (covering 36 countries under analysis) the inhabitants of Germany hold 12th position, Poland 13th, Sweden 18th and Denmark 34th position regarding the amount of time spent in traffic jams<sup>22</sup>. Due to congestion, the inhabitants of these countries spend on average, 30, 29, 26 and 16 hours per month, respectively. Experts agree that the most effective method to reduce the congestion and the related costs is to reduce the share of private cars in modal split in favour of public transport, travels on foot and by bicycle.

<sup>21</sup> T. Dyr, M. Kozłowska, Congestion costs in the European Union, „Technika Transportu Szynowego” 7-8/2017, p. 22.

<sup>22</sup> INRIX Global Traffic Scorecard, [www.inrix.com](http://www.inrix.com), (access: 12.05.2018).



# TRENDS AFFECTING PUBLIC TRANSPORT

## INCREASING NUMBER OF PRIVATE CARS:

The EU passenger car fleet grew by 4.5% from 2012 to 2016 (the number of vehicles on the road went from 241 to 252 million)<sup>23</sup>. The growing trend as for the number of private cars can be observed in almost all countries subject to analysis (table 3). Research conducted in Sweden shows that 83% of their households have got at least one private car (in Poland 63%, in Denmark 60%)<sup>24</sup>.

**Table 4.** Number of passenger cars per 1000 inhabitants

Source: dane Eurostat, [www.ec.europa.eu/eurostat](http://www.ec.europa.eu/eurostat)

Country	2005	2010	2016	2005-2016	2010-2016
Poland	323	453	571	177%	126%
Germany	559	527	555	99%	105%
Sweden	459	460	477	104%	104%
Lithuania	442(d)	554(d)	456	103%	82%
Denmark	453	481	501	111%	104%
Estonia	366	416	534	146%	128%

## INTRODUCTION OF FREE PUBLIC TRANSPORT SERVICES

To change the inhabitants' travel behaviour and encourage as many of them as possible to use public transport instead of private cars subsequent local governments in various countries decide to introduce zero-fare public transport services. We can observe a wide

<sup>23</sup> ACEA Report Vehicles in use Europe 2017, s. 3, [www.acea.be](http://www.acea.be),

<sup>24</sup> *Ibidem*, s. 17.

range of various solutions applied. Depending on the conditions fare-free travels apply to: school children, people of certain age (most often seniors), people registered within a particular area, residents of a particular country, and all people without any exceptions (including tourists).

### INCREASE IN THE IMPORTANCE OF ALTERNATIVE POWER SOURCES

One of the goals of the European Union, defined e.g. in the White Paper on Transport, is to establish competitive and resource-efficient public transport system. The EU also agreed to reduce greenhouse gas emissions by 20% (relative to 1990) to 2020 and by 80-95% to 2050<sup>25</sup>. As per the estimates provided for eBus report, in Europe at present there are over 1300 buses in operation powered by electric energy, including 956 battery electric buses (73%), 271 trolleybuses (21%), 87 Plug-in hybrid (6%). The largest electric bus fleet in Europe can be found in the **United Kingdom (ca. 18%) and the Netherlands, Switzerland, Poland and Germany (ca. 10% each)**<sup>26</sup>. In order to limit the impact of public transport vehicles on the environment, works are conducted to power the vehicles by LNG and CNG gas, biogas and hydrogen.

### INCREASE IN THE IMPORTANCE OF NEW TECHNOLOGIES

- **Distribution of tickets**

It is estimated that today in Western Europe ca. 70% (67.3%) of the inhabitants have smartphones<sup>27</sup>. It provides new possibilities for people responsible for public transport development and operation. Thanks to smartphones it is possible to provide passengers with information on any changes in the schedule and location of public transport vehicles in real time. Moreover, with the use of smartphones passengers can receive information on the most convenient line of public transport for their travel with possible changes and waiting time at the stops. Smartphones are also convenient for ticket distribution system and generate relatively low costs of such solution.

<sup>25</sup> EU climate action, [www.ec.europa.eu](http://www.ec.europa.eu), (access: 20.05.2018)

<sup>26</sup> ZeEUS eBus Report. An overview of electric buses in Europe, s. 10.

<sup>27</sup> Smartphone user penetration as percentage of total population in Western Europe from 2011 to 2018, [www.statista.com](http://www.statista.com), (access: 26.05.2018)

- **Telematic solutions**

Introduction of telematic solutions and ITS (Intelligent Transport Systems) to public transport in various cities helps to improve the quality of rendered services. Such solutions enable e.g. to: manage, diagnose and monitor public transport vehicles and give them priority in urban traffic. They can also be used to predict automatically the travel time of public transport vehicles under current traffic situation and generate proper information on electronic bus stop boards. Telematic systems also aim to facilitate private car traffic affecting at the same time the travel time by public transport along common sections of roads. Moreover, current telematic systems make it possible to penalize people who drive on bus lanes without proper authorization, fail to stop at red traffic lights and exceed speed limit.

- **Autonomization of vehicles**

After the success of autonomous underground lines works on autonomization of ground-based public transport have begun (both rail and road transport). More and more countries decide to move trial autonomous vehicles from the test routes to the streets of their cities. The first countries in Europe which decided to provide public transport services with the use of autonomous vehicles and introduced them in the city traffic included Sweden, Germany and the Netherlands. At the current development stage of autonomous vehicle technology the operational vehicles carry ca. 10-15 passengers at a speed of ca. 20-40 km/h. Therefore, the vehicles fail to constitute the alternative for city buses, only supplement their offer. The goal of the first vehicles of such type is not only to provide transport services but also make the inhabitants used to road traffic automatization, including collective and individual transport.





# REGIONS UNDER ANALYSIS



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## MAP OF REGIONS UNDER ANALYSIS

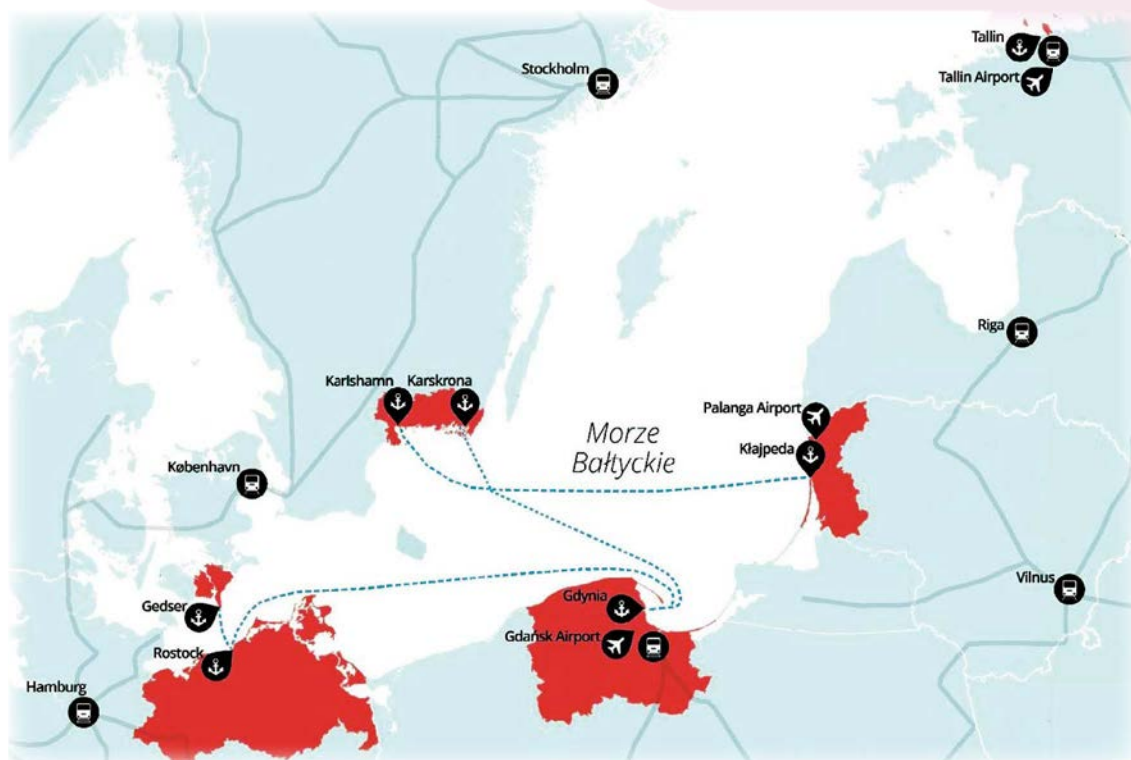


Figure 4. Map of Regions under Analysis

Source: own elaboration

The South Baltic regions which constitute the area of research within INTERCONNECT project include: Blekinge (Sweden), Guldborgsund (Denmark), Klaipeda (Lithuania), Pomorskie Voivodeship (Poland), the City of Rostock (Germany) and Viimsi Municipality, (Estonia).

## DESCRIPTION OF REGIONS UNDER ANALYSIS

Country	Germany	Sweden	Lithuania	Poland	Estonia	Denmark
Population	82 521 653	9 995 153	2 847 904	37 972 964	1 318 705	5 748 769
Area [km <sup>2</sup> ]	357 021	447 435	65 300	312 679	45 266	2 211 000
Population density	233,1	24,4	45,8	123,6	29,1	136,4

Country	Mecklenburg-Vorpommern	Blekinge	Klaipėda County	Pomeranian Voivodeship	Harju county	Sjælland (Zealand)
Population	1 610 674	158 453	324 628	2 285 800	582 556	832,553
Area [km <sup>2</sup> ]	23 174	3 039	5 209	18 300	4 338	7 273
Population density	71,4	52,1	70,4	128,9	134,3	115,2
the capital of the region	Hanseatic City of Rostock	Karlskrona	Klaipėda	Gdańsk	Viimsi*	
Population	208 000	32 000	150 000	463 754	19 782	
Area [km <sup>2</sup> ]	181	22	98	262	73	
Population density	1148	1454	1814	1770	271	

\* The capital of the region is Tallinn. Viimsi is the administrative centre of Viimsi Parish (one of the twelve parishes in Harju County).

Table 5. Statistics of Regions under Analysis  
Source: own elaboration

## ROSTOCK

Located in north-eastern Germany. It is the largest in terms of area and number of inhabitants city with county status in northern Germany, Mecklenburg-Vorpommern state. The city covers the area of 181 km<sup>2</sup> and is inhabited by ca. 210 thousand people. In Rostock there is the third largest seaport in Germany, the largest German port in the Baltic (28.8 million tonnes of goods were handled in the port city of Rostock in 2017). Rostock has also its ferry port providing transport services e.g. to Helsinki (Finland), Gedser (Denmark) and Trelleborg (Sweden). The port is visited by ca. 160 passenger ships carrying ca. 250 000 passengers. To the south-east of Rostock, 28 km away there is also Rostock-Laage Airport which handled ca. 290 thousand passengers in 2017. The airport manages flights, first of all, to Munich and Nurnberg and charter flights to the south of Europe.

## REGION BLEKINGE

One of 21 Swedish administrative regions and the second smallest (after Öland) in terms of the area from among 25 Swedish provinces. The region of Blekinge is located in the South-East of Sweden along the Baltic Sea and covers 3.055 km<sup>2</sup> (only 0.7% of the total area of the country) and is inhabited by ca. 160 thousand people (158.453). The capital of the region is Karlskrona inhabited by ca. 36 thousand people (36 477). The city located on over 30 islands has all-year-round ferry connection with Gdynia managed by Stena Lina ferries. It is also situated on E22 highway from Kalmar to Malmö.

## KLAIPEDA COUNTRY

Area of 5209 km<sup>2</sup> situated in western part of Lithuania, between Latvia and the Russian Kaliningrad Oblast. One of the ten counties in Lithuania. The capital of the region is the third largest city in Lithuania - Klaipeda. Thanks to close vicinity of the Baltic Sea, in the region there is the largest container port in Lithuania and ferry seaport. Regular ferry service is provided between Klaipeda and Kiel (Germany) and Karlshamn (Sweden). In Klaipeda there are also two ferry ports connecting the city with the Curonian Spit. The Old Ferry port handles only pedestrian and bicycle traffic, whereas the New Ferry port is also used to transport vehicles. Klaipeda is perceived as the Lithuanian transport hub connecting sea, road and rail transport.

## POMORSKIE

One of the 16 Polish (one of three located at the Baltic Sea). The Pomorskie Voivodeship is inhabited by ca. 2.3 million people, which constitutes 5.8% of the Polish population. The centre of the region and also the northern part of Poland is Tricity agglomeration comprising Gdańsk, Sopot and Gdynia. The capital of Pomorskie and the largest city is Gdańsk with 464 thousand inhabitants. Pomeranian Voivodeship is an integral part of the Trans-European Transport Network (TEN-T). Pomorskie is an integral part of the Trans-European Transport Network (TEN-T). In the Pomorskie there is the northern part of the Baltic-Adriatic Corridor, one of the nine main transport corridors of the TEN-T network, connecting the Baltic Sea with the Adriatic.

In the Pomorskie there is Lech Wałęsa international airport which handled over 4.6 million passengers in 2017; there are also two seaports in Gdynia and Gdańsk, one of the largest facilities of such type in the Baltic Sea region. They handle almost all types -of cargo and ships, and provide regular ferry services to Nynäshamn (Sweden), Karlskrona (Sweden), Helsinki (Finland) and Hanko (Finland). The geographic and market-related position of seaports in Gdynia and Gdańsk qualifies them to play the role of distribution and logistics centres within the Baltic Sea region and countries of the Central and Eastern Europe.

## VIIMSI MUNICIPALITY

Municipality in northern Estonia located in Harju province. The capital of the region is Tallinn. Viimsi is the administrative centre of Viimsi Parish (one of the twelve parishes in Harju County), situated 11 kilometres north from Tallinn, on the coast of Baltic Sea. The region covers 73 km<sup>2</sup> and is inhabited by 19 387 people. Twelve kilometres from Viimsi there is Port Muuga, the largest Estonian freight and passenger port in the Baltic Sea region. In Tallinn there is also the largest Estonian airport handling over 2 million passengers every year.

## GULDBORGSUND

One of the 98 Danish municipalities, located within the Zealand region. Guldborgsund Municipality covers 903 km<sup>2</sup> and is inhabited by ca. 61 thousand people. The main city of Guldborgsund Municipality is Nykøbing Falster inhabited by nearly 20 thousand people.



The railway station situated in Nykøbing Falster provides railway services e.g. to Copenhagen and Hamburg. Two European transport corridors go through the municipality; E55 towards Rostock, Berlin and East Europe and E47 toward Hamburg and West Europe. The nearest Lolland-Falster Airport is located 35 km from Nykøbing Falster in Lolland. It is the only international airport south from Roskilde. On the island of Falster in Gedser there is also ferry terminal handling car ferries to Rostock (Germany).



# PUBLIC TRANSPORT ORGANIZATION AND MANAGEMENT SYSTEMS



One ticket to the future



# DIFFERENCES AND SIMILARITIES OF PUBLIC TRANSPORT ORGANIZATION AND MANAGEMENT SYSTEMS

To make planning, management and organization of public transport effective it is necessary to assign particular tasks to entities responsible for them. In the analysed regions the responsibility for public transport operation is divided between local governments, public transport authorities and specialized departments in city halls and municipal offices.

Responsibilities of entity	Rostock	Blekinge	Klaipėda	Pomeranian Voivodeship	Viimsi Municipality	Guldborgsund
to prepare and implement the regional transport strategy	Department of Transportation of the Hanseatic City of Rostock	Department of regional development/Blekingetrafiken (regional public transport management body)	Klaipėda city municipality	Marshall Office of the Pomeranian Voivodeship	National Road Administration, North-Estonian Public Transportation Centre, Municipalities	Region Zealand
to integrate the management of the transport sectors		Department of regional development/Blekingetrafiken (regional public transport management body)	Klaipėda city municipality	Marshall Office of the Pomeranian Voivodeship	Viimsi Municipality	Ministry of Transport and Region Zealand
to coordinate investments in public transport, including those undertaken by local governments or public utilities	Department of Transportation of the Hanseatic City of Rostock in cooperation with Rostocker Straßenbahn AG	Blekingetrafiken (regional public transport management body)/Municipalities of Blekinge	Klaipėda PT authority	Marshall Office of the Pomeranian Voivodeship Municipalities	Viimsi Municipality	Ministry of Transport, Region Zealand and Guldborgsund Municipality

Responsibilities of entity	Rostock	Blekinge	Klaipėda	Pomeranian Voivodeship	Viimsi Municipality	Guldborgsund
to plan and develop of tariff concepts	The Transport Association Warnow (VWV)	Blekingetrafi-ken (regional public transport management body)	Klaipėda city municipality	PT authorities	Viimsi Municipality	DSB, Movia, Lokaltog, Scandlines
traffic management e.g. ICT	Rostocker Straßenbahn AG in cooperation with Transport Association Warnow (VWV)	Blekingetrafi-ken (regional public transport management body)	Klaipėda PT authority	Road and Greenery Management Authorities (or equivalent)	Viimsi Municipality	Rejseplanen.dk
to develop of pedestrian and bicycle transport	Department of Transportation of the Hanseatic City of Rostock	Department of regional development	Klaipėda PT authority	Municipalities	Viimsi Municipality	The Road Directorate, Guldborgsund municipality
ticket distribution	Rostocker Straßenbahn AG in cooperation with other companies organized in Transport Association Warnow	Blekingetrafi-ken (regional public transport management body) / Contractors that operates the public transport	Klaipėda PT authority	PT authorities	North-Estonian Public Transportation Centre	DSB, Movia, Lokaltog, Scandlines

Table 6. Division of responsibility between institutions in regions under analysis

Source: own elaboration

# FINANCING PUBLIC TRANSPORT SERVICES

In the majority of European countries public transport services are provided in two ways, as public and commercial services. The characteristic feature of public transport (in particular urban transport) provided as public services in the majority of countries worldwide, including EU member states, is its unprofitability. It means that the public transport operational costs are higher than income from ticket sales. Therefore, the efficient operation of public transport (as public services) requires its financing from public funds. Consequently, the financing of public transport is divided between people using the service (through purchase of tickets), and non-users, people usually travelling by other modes of transport (mainly by private cars). This is because not only public transport users but the entire population benefit from public transport services (reduced congestion, cleaner air, lower level of noise, etc.).

Subsidies for public transport affect the price and scope of provided services. Therefore, thanks to public funds public transport services can be rendered for the public at a lower price than it would result from economic calculation. Public transport services can also be rendered in areas and time periods of lower demand (as a result their availability and quality is higher).

In the Pomorskie the funding structure of public transport services differs depending on the operator (area where public transport services are provided). On average, the income from ticket sales and additional charges incurred by passengers, as well as fines (resulting mainly from travelling without a valid ticket) covers ca. 40-50% of expenses related to public transport operation.

Other expenses are covered from budget subsidies of local governments where public transport is managed. For example, at ZKM network in Gdynia (operating within: Gdynia, Rumia, Sopot, municipalities: Kosakowo, Szemud, Wejherowo, Żukowo) the income covers ca. 44% of expenses (other 56% is covered by subsidies). Whereas, at ZTM network in Gdańsk (Gdańsk, Sopot, Pruszcz Gdański, municipalities: Kolbudy Pruszcz Gdański, Żukowo) the income covers ca. 47% of expenses (other 53% is covered by subsidies). The majority of conducted analyses prove that the scale of necessary budget subsidies from local governments in the Pomorskie Voivodeship will increase. In Blekinge region the income from ticket sales cover ca. 50% of public transport operational costs.



Other 50% is covered from subsidies from five municipalities where public transport services are provided and the council of Blekinge.

In all other regions under analysis public transport also receives subsidies from public funds. In the case of Hanseatic City of Rostock subsidies for public transport come from Hanseatic City of Rostock, the administrative district and Mecklenburg-Vorpommern state. Within Viimsi Municipality subsidies come from municipality budget. Whereas in Klaipeda from Klaipeda City municipality, Klaipeda district municipality and Kretinga district municipality. In the region of Guldborgsund public transport is subsidised by the Municipality of Guldborgsund. Special subsidies are provided for public transport services rendered for people with disabilities and school bus services.



# GROUPS ENTITLED TO FREE PUBLIC TRANSPORT TRAVELS

## ROSTOCK

In Rostock there is no fare-free urban transport. Discounts on ticket prices are available for children and teenagers up to 15 years of age and groups travelling together in the number of max. 5 people (travelling under group ticket).

In Rostock there is also Mobli60 ticket. It provides seniors (people aged over 60) with a possibility to use public transport services at preferential terms. Discounts are also available for students and employees of companies using JobTicket.

## BLEKINGE

In Sweden fare-free urban transport was introduced e.g. in the cities of Avesta, Hallstahammar, Jokkmokk, Kiruna, Kölsillre, Ockelbo and Övertorneå; however, it was not introduced within the region of Blekinge. In the offer there are special tickets (in the form of cards) for schools, companies and tourists. People traveling with a child or a big dog have to buy tickets but transport of a bicycle by train is free of charge. Within Blekinge there are no discounts for the young (school children) and the elderly (senior citizens).

## KLAIPEDA

In Klaipeda fare-free public transport has neither been introduced nor are any works performed to introduce such services. Under national law there are two types of discounts for tickets, 50% or 80%. for several social groups. In 2018 as a pilot action – free public transport during Sea festival (27-29 July), to reduce usage of private car. Operational costs was covered by city budget.

## POMORSKIE REGION

In the Pomorskie fare-free public transport is available for school children and students up to 20 years of age in Gdynia, Sopot, Rumia, Żukowo, Kosakowo and Szemud (under valid school ID) and up to 24 years of age in Gdańsk (under valid school ID and verified Gdańsk City Card). Free transport services are available for the young only within their place of residence. In Pomorskie also Kościerzyna and Pruszcz Gdański (only one bus line operating in the city) have fare-free public transport. Kościerzyna have fare-free public transport for everyone since 2015 (as the first city in Poland).

## VIIMSI MUNICIPALITY

In 2013, in Tallinn referendum was held on fare-free public transport services. As many as 75% of inhabitants voted in favour so Tallinn became the first European capital to provide fare-free urban transport services. The inhabitants of Tallinn, who have "green card", are exempt from transport fees. From July 2018, 11 of Estonia's 15 counties introduced free public transport on county buses. At the moment Harju County including Viimsi Municipality have chosen to implement free bus transport only for students and pensioners over age 63.

## GULDBORGSUND

Today in Guldborgsund Municipality there is no fare-free urban transport. Discounts are available for seniors and the young. However, a new test route in a rural area has been established in close dialogue with local citizens in order to meet specific local needs. As part of the test the route is free of charge.

The use of CHECK IN, CHECK OUT system in buses and trains makes it possible to calculate the cost of travel very precisely. Thanks to such solution a passenger using e-ticket (compared to passenger with a single journey ticket) incurs costs lower by ca. 40% in case of short trips and 75% in case of longer trips.

# THE MOST RELEVANT PUBLIC TRANSPORT DEVELOPMENT PLANS

On the one hand, the mobility of society contributes to social and economic development, on the other, generates adverse effects (congestion, accidents, pollution of environment, noise, etc.). In order to counteract excessive negative impact of transport it is necessary to rationalize the division of tasks between public and individual (mainly private cars) transport. Sustainable transport especially in cities requires reduced number and distance of travels made by the inhabitants. Therefore, the sustainable transport development requires proper spatial development and optimal public transport development.

To make sustainable development of public transport possible it is necessary to plan it. The basic instrument used for planning and management of public transport in numerous European cities (in some countries the obligation to develop plans for sustainable development of public transport is imposed by legislator) are regularly developed and widely consulted with all stakeholders interested in transport plans. The introduction of transport plans helps to offer more effective public services as well as more attractive for passengers. Thanks to transport plans it is possible to:

- adapt the number and quality of public transport services to the preferences and expectations of passengers (including people with disabilities),
- ensure the quality of public transport services so that public transport becomes real alternative for passengers traveling by private cars,
- coordinate actions and plans for transport development on various levels (local, regional and national), as well as coordinate transport development with local spatial development plans,
- reduce adverse impact of transport (both collective and individual) on the environment,
- provide expected economic and financial effectiveness of developed solutions regarding developing the transport offer and infrastructure.

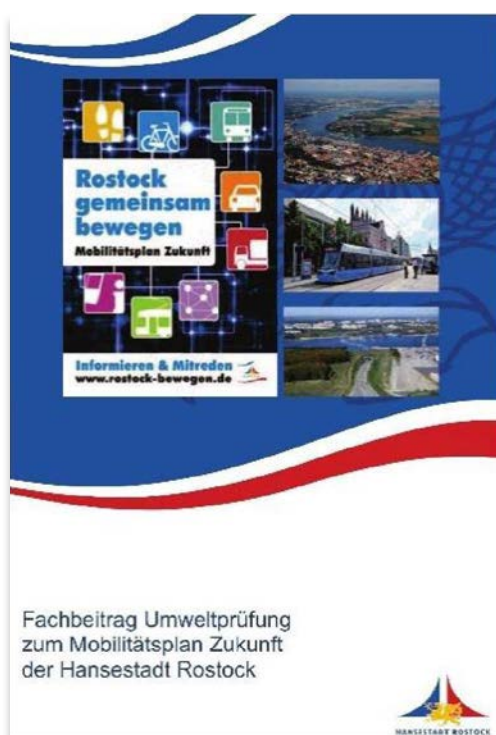
Transport planning is defined as “planning required in the operation, provision and management of facilities and services for the modes of transport to achieve safer, faster, comfortable, convenient, economical and environment-friendly movement of people and goods”<sup>28</sup>.

<sup>28</sup> Definition of 'Transport Planning', [www.economicstimes.indiatimes.com](http://www.economicstimes.indiatimes.com), (access: 08.05.2018)

# ROSTOCK

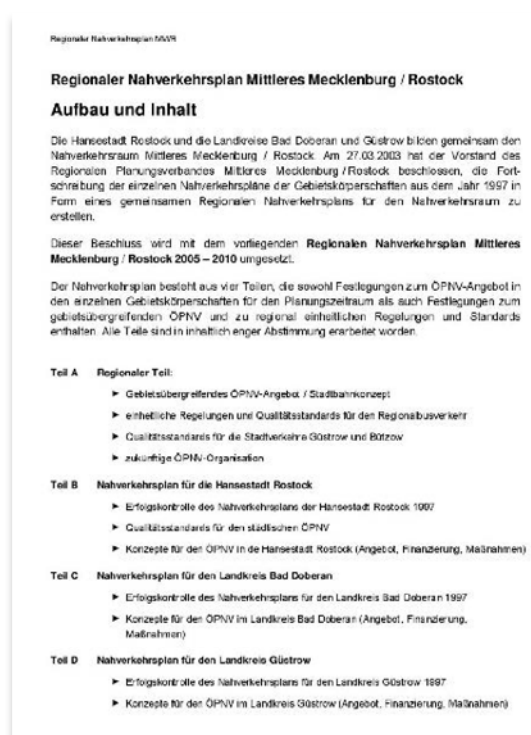
Table 7. Most relevant public transport development plans

Source: own elaboration



## MOBILITY PLAN FUTURE Mobilitätsplan Zukunft

Source: <https://www.rostock-bewegen.de>



## REGIONAL TRANSPORT PLAN Regionaler Nahverkehrsplan

Source: <https://www.landkreis-rostock.de>



## BLEKINGE



**REGIONAL PUBLIC TRANSPORT  
DEVELOPMENT PLAN**  
*Trafikförsörjningsprogram för Blekinge  
2016-2019*

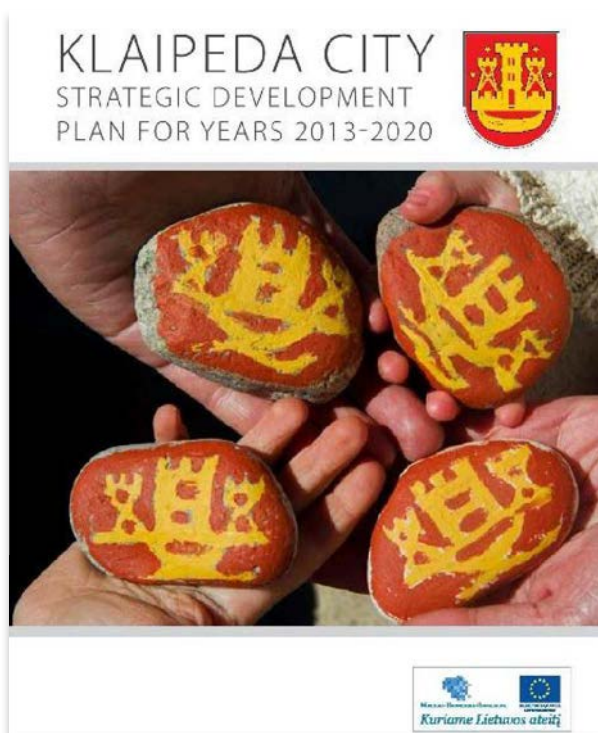
Source: <http://regionblekinge.se/>



**LAND TRANSPORT PLAN FOR BLEKINGE  
2018-2029**  
*Länstransportplan för Blekinge 2018-2029*

Source: <http://regionblekinge.se/>

# KLAIPEDA



**KLAIPEDA CITY STRATEGIC  
DEVELOPMENT PLAN FOR YEARS  
2013-2020**

Source: <http://civitas.eu>



**KLAIPEDA SUMP**  
*Klaipėdos Miesto Darnaus Judumo Planas*

Source: <https://www.klaipeda.lt>

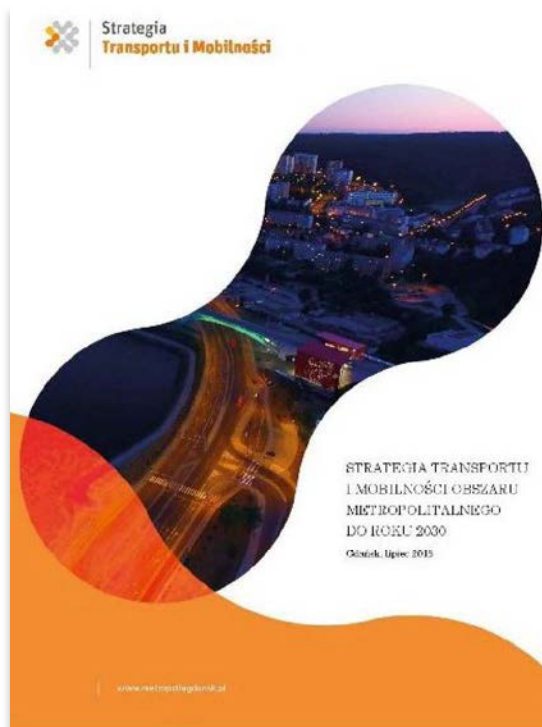


## POMERANIAN VOIVODESHIP

### PLAN OF SUSTAINABLE DEVELOPMENT OF PUBLIC COLLECTIVE TRANSPORT FOR THE POMORSKIE VOIVODESHIP

*Plan Zrównoważonego Rozwoju Publicznego Transportu Zbiorowego dla Województwa Pomorskiego*

Source: <https://bip.pomorskie.eu/>



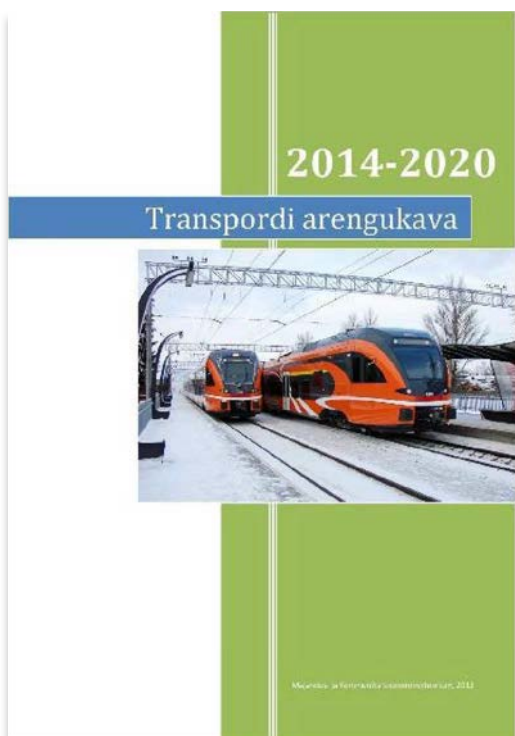
**STRATEGY OF TRANSPORT AND MOBILITY OF THE METROPOLITAN AREA UNTIL 2030**  
*Strategia Transportu i Mobilności Obszaru Metropolitalnego Do Roku 2030*

Source: <https://www.metropoliagdansk.pl>



**PLAN OF SUSTAINABLE DEVELOPMENT OF PUBLIC COLLECTIVE TRANSPORT FOR THE POMORSKIE VOIVODESHIP**  
*Plan Zrównoważonego Rozwoju Publicznego Transportu Zbiorowego dla Województwa Pomorskiego*

Source: <https://pbpr.pomorskie.eu>

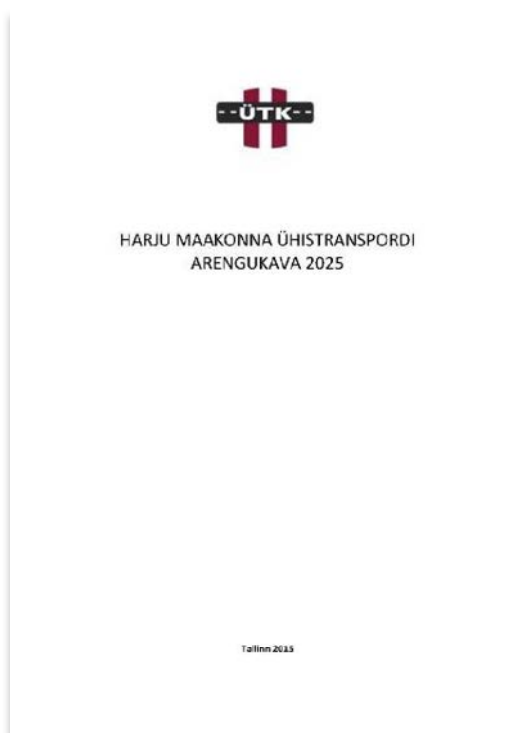


## VIIMSI MUNICIPALITY

### NATIONAL TRANSPORTATION ACTION PLAN 2014-2029

*Transpordi Arengukava 2014-2020*

Source: <https://www.mkm.ee>



**HARJU COUNTY'S PUBLIC  
TRANSPORTATION ACTION PLAN 2025**  
*Harju Maakonna Ühistranspordi  
Arengukava 2025*

Source: <http://www.harjuytk.ee/>



**HARJU COUNTY'S PLANNING 2030+**  
*Harju Maakonnaplaneering 2030+*

Source: <http://www.maavalitsus.ee/>



# GULDBORGSUND



**ZEALAND LEADS THE WAY FORWARD**  
*Sjælland Baner Vejen Frem*

Source: <https://www.regionsjælland.dk>



**VISIONS FOR THE RAILWAY SERVICES  
IN THE ZEALAND REGION**  
*Visioner For Banetrafikken I Region  
Sjælland*

Source: <https://www.landkreis-rostock.de>



# TARIFF AND TICKETING SYSTEM IN PUBLIC TRANSPORT



One ticket to the future

## TARIFF AND TICKETING SYSTEM SOLUTIONS

In all analysed regions there are tickets for passengers who do not use public transport regularly, but occasionally or for a single journey (single-journey/hour/24-hour tickets). There are also seasonal tickets (30-day/monthly/90-day/semester tickets) for passengers who use public transport regularly to meet their daily travel needs. Among regions under analysis, Blekinge and Pomeranian Voivodeship provide the largest offer of public transport tickets.

Rostock	Blekinge	Klaipeda	Pomeranian Voivodeship	Viimsi Municipality	Guldborgsund
Single ticket, 1 day tickets, 1 week ticket, 1 month tickets	Single ticket 30 days ticket Student ticket Leisure ticket (valid on working days between 5pm-4am, and weekends) Flex 20 days 24h / 72h Summer ticket (valid from 15 June to 15 August)	Single ticket, 1/3/7 days ticket Zone I - 1/6/12 month ticket (only working days or all days) II-III zone month tickets Combine I or I-III month tickets	Single ticket, 1/24 hours ticket 1/3 days ticket 1 month/30 days ticket (from Monday to Friday or all days) Semester tickets (valid for 4/5 months)	Single ticket 1 month/30 days ticket	Single ticket 1 month/30 days ticket

Table 8. Types of public transport tickets

Source: own elaboration

Estonia is perceived by many as ‘the most advanced digital society in the world’<sup>1</sup>. Therefore, it is no surprise that the area of Viimsi Municipality as the first from municipalities under analysis that decided to abandon distributing paper tickets and shift to e-ticket. The data carrier of public transport tickets in Estonia is ID card or smartcard. City cards are issued anonymously but every passenger has a possibility to personalize their smartcard in a stationary point of sale or via Internet. Personalized card entitles its holder to benefit from discounts (thanks to integrating ticket system with the government database discount is calculated automatically for people with the status of a student, senior citizen or people with disabilities) and protects against the loss of ticket in case of theft or loss of card. All other partner regions under analysis are still using paper tickets.

Types of tickets	Rostock	Blekinge	Klaipėda	Pomeranian Voivodeship	Viimsi Municipality	Guldborgsund
Paper	Yes	Yes	Yes	Yes	No	Yes
e-ticket	No	Yes	Yes	Yes	Yes	Yes
Card/pass	Yes	Yes	Yes	Yes	Yes	Yes
Mobile application	In preparation	Yes	In preparation	Yes	No	Yes

**Table 9.** Types of public transport ticket carriers

Source: own elaboration

One of the activities taken by public transport operators aiming at facilitating the purchase of tickets by passengers is to introduce new data carriers of public transport tickets. The currently used carriers which are becoming more and more popular are mobile phone applications. They make it easier to buy a ticket without the need to wait at ticket machines or ticket validators and they do not divert driver’s attention from work. These days, the public transport ticket can be bought via mobile app in Blekinge and Pomeranian Voivodeship; works on introducing such solution are also in progress in Rostock. The app which enables buying public transport tickets is not only the ticket distribution channel but also the source of information on passengers. Via the app it is possible to transfer

information on timetables, changes in timetables and location of public transport vehicles in real time. Therefore, the solution helps to reduce the waiting time for passengers at the stops, making the time needed for door-to-door travel by public transport closer to travel by private car.

**Table 10.** Distribution channels of particular types of tickets

Source: own elaboration

Types of tickets	Rostock	Blekinge	Klaipėda	Pomeranian Voivodeship	Viimsi Municipality	Guldborgsund
<b>Paper</b>	cash sales in customer centers mobile ticket machines stationary ticket machines agencies subscription	Salesagents. Mostly stores close to stations	Buses, kiosks	Kiosks Bus drivers/train conductor Points of Sale of Season Tickets stationary ticket machines		Kiosks, ticket machines, Bus drivers/train conductor
<b>e-ticket</b>		Homepage of Blekingetrafiken	Kiosks, Customer center, internet	Website, Points of Sale of Season Tickets	Bus, website, kiosks	Website
<b>Card/pass</b>	ticket machines in busses/trams and at stops/stations university companies	Vehicles, ticketmachines on platforms, schools, companies	Kiosks, Customer center, Website	Points of Sale of Season Tickets, Website	Website, kiosks	Kiosks, ticket machines, apps, Bus drivers, Website
<b>Mobile application</b>		App of Blekingetrafiken	APP Ridango/Klaipėda	App: GoPay, jakdojade.pl, moBILET SkyCash;		App:
<b>Other</b>	Ticket sales from the block (RSAG)	Ex: Health care institutions				



In regions under analysis, in order to facilitate the purchase of public transport ticket various distribution channels are used. In all regions passengers can purchase ticket on the means of transport (in ticket machines or at the driver's). Moreover, in the analysed regions public transport paper tickets are distributed through the network of stationary points of sale. Most of the analysed regions provide also stationary ticket machines located at public transport stops and stations to distribute tickets.

Some analysed regions (Klaipeda, Pomeranian Voivodeship) differentiate ticket price depending on the distribution channel. Higher ticket price referring to tickets purchased at the driver's are to discourage passengers to use this distribution channel, unless absolutely necessary. This is because the purchase of ticket at the driver's may affect the time the vehicle stays at the stop and consequently, the travel time. Whereas, the electronic distribution channels are favoured since they are characterized by the lowest operational costs.

The e-tickets available in the majority of analysed regions make it possible to use them as „e-ports“. It helps to integrate the public transport ticketing systems with ticketing systems of other institutions and buy tickets from various entities via the same data carrier. In Rostock, public transport e-ticket can be used as carrier for theatre ticket. In Viimsi Municipality, common ticket carrier is used by public transport, museums, ZOO, sport facilities and Park&Ride system.





## CURRENT SCALE OF PUBLIC TRANSPORT INTEGRATION IN REGIONS

The degree of public transport integration is one of the factors affecting the attractiveness and quality of rendered services. The integration of public transport services makes it possible to:

- strengthen the competitive edge of collective transport relative to individual transport,
- reduce the costs of public transport services through eliminating lines that substitute each other,
- increase the scale and effectiveness of performed marketing activities (more effective ticket distribution, better possibilities to differentiate prices, more effective promotion of public transport, and easier transfer of information from enterprise to client).

Transport services may be subject to integration on various levels. The integration of transport may include:

- integration of public transport systems of various spatial scope (e.g. local with regional transport, national and international),
- integration of services provided by various public transport operators within one level of spatial scope,
- integration of collective and individual transport.

Most frequently, as a result of transport service integration the offers of particular operators within a particular area integrate. Thanks to that it is more convenient for passengers to choose from various connections.

## ROSTOCK

In Rostock, Regional Traffic Association (VVW Verkehrsverbund Warnow) is responsible for public transport integration. VVW coordinates all means of public transport providing services in the region of Central Mecklenburg, especially in the Hanseatic city of Rostock and its region, i.e. regional and city buses, trams, city trains (S-bahn) and ferries. Integration in the meaning of „ONE TICKET. ONE TARIFF. ONE REGION“ principle helps to ensure that public transport offers the quality of services meeting the expectations of passengers living outside the city (where population density is low) as well as urban areas. The integration of all means of transport makes it possible to coordinate timetables and route networks so that passengers are provided with easy and safe possibilities to change between various means of transport. Moreover, tariff and ticketing integration ensures changing between various means of transport with one valid ticket. The integration of particular means of transport in Rostock enables more effective promotion of public transport as the attractive and friendly to the environment alternative to travels by individual transport.

## BLEKINGE

Blekingetrafiken (the regional public transport management body) is responsible for the integration of public transport offer within Blekinge, as well as from and to Blekinge. The tasks of Blekingetrafiken include the organization of:

- public transport bus services in Blekinge and to and from the neighbouring administrative regions,
- urban bus transport in the cities of Karlskrona, Karlshamn, Ronneby and Sölvesborg,
- trains operating between Karlskrona and Malmö and Copenhagen,
- rail connections from Krösätågen to Karlskrona and Emmaboda,
- railway traffic between Pågatågen and Karlshamn and Kristianstad,
- ferry connections within Blekinge archipelago,
- school buses in Blekinge.

Thanks to the public transport integration in the region of Blekinge both the inhabitants and tourists can benefit from the transport offer of buses, trains and boats under tickets distributed by one operator.

## KLAIPEDA

In Klaipeda County, Klaipėda Passenger Transport company is responsible for public transport integration. The tasks of this operator include, *inter alia*:

- distribution of tickets valid in all means of public transport,
- coordination of routes and timetables of public transport,
- management of passenger information system and its facilitation.

As a result of assigning the organization of public transport to one operator in Klaipeda Country not only tariff and ticketing integration has been performed but also organizational and operational integration. Nowadays network consist of 58 routes running in 4 municipalities, in 3 ticket zones.

## POMORSKIE

In Pomorskie, the organization of transport is the responsibility of over 100 entities (123 municipalities, 16 counties and local government), with contract with operators – providing services to the public – concluded with 11 entities, including 10 cities: Gdańsk, Gdynia, Chojnice, Kwidzyn, Słupsk, Lębork, Starogard Gdański, Tczew, Wejherowo, Malbork and the Governor of Pomorskie. The multitude of entities and limits in their competence referring to their areas resulted in no public transport integration (both tariff and ticketing system as well as organizational integration) in the Pomorskie. The lack of integration affects the quality of public transport offer and generates difficulties in clear transfer of information on transport offer between public transport operators and passengers (in particular passengers who are not residents of the Pomorskie or come from abroad). Moreover, the lack of integration resulted in multitude of price policies provided by various operators, and thus, multitude of tariff systems. Within Tricity only (agglomeration of three cities: Gdańsk, Gdynia, Sopot) there are several tariff systems:

- time-limit tariff in buses and trams in Gdańsk;
- zone-based tariff in buses and trolleybuses in Gdynia and in buses managed by Miejski Zakład Komunikacji w Wejherowie Sp. z o.o.;
- section-based tariff used by railway operator PKP Szybka Kolej Miejska w Trójmieście Sp. z o.o.;

The lack of tariff and ticketing system integration within the Pomorskie is also visible in discrepancies between discounts for public transport passengers (which are not statutory discounts) provided by various operators.

The partial integration of public transport in some part of the Pomeranian Voivodeship with the metropolis at the Gulf of Gdańsk resulted from establishing the Metropolitan Association of Communication Gulf of Gdańsk (MZKZG). MZKZG distributes tickets accepted by:

- Public Transport Authority of Gdansk (ZTM Gdańsk);
- Public Transport Authority of Gdynia (ZKM Gdynia);
- Public Transport Operator in Wejherowo (MZK Wejherowo);
- Urban Rail (SKM including PKM);
- Regional Rail (Przewozy Regionalne).

In order to increase the competitiveness of public transport relative to individual transport in the Pomorskie one common ticket is planned to be introduced. Such solution aiming at establishing regional unified fare collection system and unified information for passengers shall be operational since 2020. The goals of the initiative include:

- simplifying procedures for the purchase of one-time, seasonal and combined tickets;
- low-cost increase in the network and distribution channels for all types of tickets;
- introduction of possibility to settle precisely the income from transport fares between particular entities, operators and carriers;
- possibility to obtain transport related data useful for transport entities, e.g. on the flow of passengers, location of vehicles at a particular time, etc.;
- introduction of integrated passenger information available within the entire area under integration.

In compliance with the sustainable development of collective public transport for the Pomorskie the integration of public transport should involve integration on four levels:

- institutional integration,
- tariff and ticketing system integration,
- timetable integration,
- integration of service information.

## VIIMSI MUNICIPALITY

The tariff and ticketing system integration within Viimsi Municipality was implemented by Ridango company. For the company is responsible for ticketing system implemented in 2010 in Tallinn and the whole region of Harju covering Viimsi Municipality. The developed ticketing system integrates several operators, bus, trolleybus and tram operators who manage a fleet of ca. 750 vehicles operating within the region of Harju. The system provides information in real time on timetables and location of public transport vehicles. The ticketing system integration within Viimsi Municipality goes beyond the area of public transport. For the city card is also used as data carrier of tickets to Park&Ride system, ZOO, museums and sport facilities.

## GULDBORGSUND

In Guldborgsund Municipality passengers can travel the whole journey from the starting point to the place of destination by public transport under one ticket (it also refers to e-ticket, paper ticket as well as mobile ticket apps). In general, there is no integration between the land and water-borne public transport. However, for the Scandlines ferry between Gedser in Guldborgsund Municipality and Rostock a special ticket "Intercombi-ticket" has been developed in cooperation between Scandlines, Movia and Verkehrsverbund Warnow in Rostock so that only one ticket is needed between Nykøbing Falster and Rostock Centrum. (The Scandlines Ferry ticket with discount to Hansa Park is not a ferry line in from Guldborgsund Municipality, and therefore not really important here).





# FLEET



## FLEET

	Rostock	Blekinge	Klaipėda	Pomera- nian Voivode- ship	Viimsi Municipa- lity	Guldbor- gsund
<b>Buses</b>	68	125	220	695	9	12 lines
<b>Trolleybuses</b>	0	0	0	93	0	0
<b>Trams</b>	53	0	0	169	0	0
<b>Trains</b>	0	8	0	72 [SKM]	0	76 departures daily
<b>Ferries and boats</b>	31	8	0	2	0	9 departures daily

**Table 11.** Fleet of public transport used in regions under analysis

Source: own elaboration

All analysed regions tend to provide public transport services using the most modern fleet of vehicles. It is also intended to introduce into operation vehicles which are most friendly to the environment (powered by electric energy, CNG or meet the highest Euro emission standards). All analysed regions also tend to ensure the highest availability of public transport for people with disabilities. To this end, in Rostock all tram stops and the majority of bus stops (62%) have been so designed to remove all barriers for people with disabilities. Moreover, the fleet of vehicles is also adapted to render transport services for people with disabilities. All buses are low-floor buses and are equipped with wheelchair ramp. Also in Klaipėda all city buses, new route-taxi, both 12-meter and 16.5-meter are low-floor buses. In Blekinge all vehicles used in public transport are adapted to the needs of people with disabilities,



as well as 85% of stops and stations used by at least 20 people daily. In the Pomorskie all buses and trolleybuses used in fleets of the largest operators, ZTM Gdańsk, ZKM Gdynia, ZIM Słupsk, and MZK Wejherowo are low-floor vehicles.



A woman with glasses is seen from the side, looking at a tablet computer. She is wearing a purple patterned sweater. The background is blurred, suggesting she is on a train. The overall image has a pink and purple color scheme with abstract shapes.

# LATEST/MOST IMPORTANT INVESTMENTS IN PUBLIC TRANSPORT

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# ROSTOCK

## NEW TRAMS OF THE ROSTOCKER STRASSENBAHN AG

*Copyright Joahim Kloock*



Since 2015, 13 new trams are more energy efficient than the previous models. High-performance energy storage units (so-called "supercaps") on the roofs of new trams store valuable braking energy. That energy is reused for starting the bus as well as for heating and air conditioning. Furthermore, RSAG purchases electricity from renewable energy sources.



### PEDELEC RENTAL STATION „ELROS – ELECTRIC MOBILITY IN ROSTOCK“

Copyright RSAG



More than 30 rental pedelecs in five stations – three in Rostock and two in the surrounding area – are a small supplement to public transport. With those electric bikes, RSAG offers environmentally friendly mobility for commuters, recreational cyclists and tourists since 2014. The system operates fully automatically - booking and payment are possible via the Internet. Bikes can be returned at any station, provided a charging box is available.

## INVESTMENTS IN THE BUS FLEET

*Copyright Joahim Kloock*



Four new low-floor articulated buses and two low-floor standard buses of the latest generation with EURO VI standard have been in operation since June 2018. This means that around 90% of all RSAG buses comply with EURO VI emissions standard or the previously applicable EEV standard. With only 0.4g/kWh of NOx and 0.01g/kWh of particulate mass, buses are cleaner than many cars on the roads.

## MOBILE TICKETING CAMPAIGN

Copyright VVV



# MOBILE TICKETING: EINFACH STARTING

Single and daily tickets can be booked conveniently and cashless with App of the regional Transport Association Warnow (VVW – Verkehrsverbund Warnow) or at the online shop since May 2018. In 2019, the mobile ticketing service will be expanded to include weekly and monthly tickets. Operating systems are Android and Apple iOS.



# BLEKINGE

NEW BUSES IN BLEKINGE 2014

*Blekingetrafiken*



In the latest procurement covering bus operator in Blekinge 120 new buses were put into operation all over Blekinge. Thanks to this investment, the Blekinge region has become the most environmentally friendly region in Sweden with the fossil-free fuel HVO (Hydrated vegetable oils) in 90% of buses and a number of electric-hybrid-buses in the cities. The new contract provided 100% buses adapted to the needs of people with disabilities.



## PASSING TRACK ÅNGSÅGSMOSSEN 2012

Source: [www.postvagen.com/forum](http://www.postvagen.com/forum)

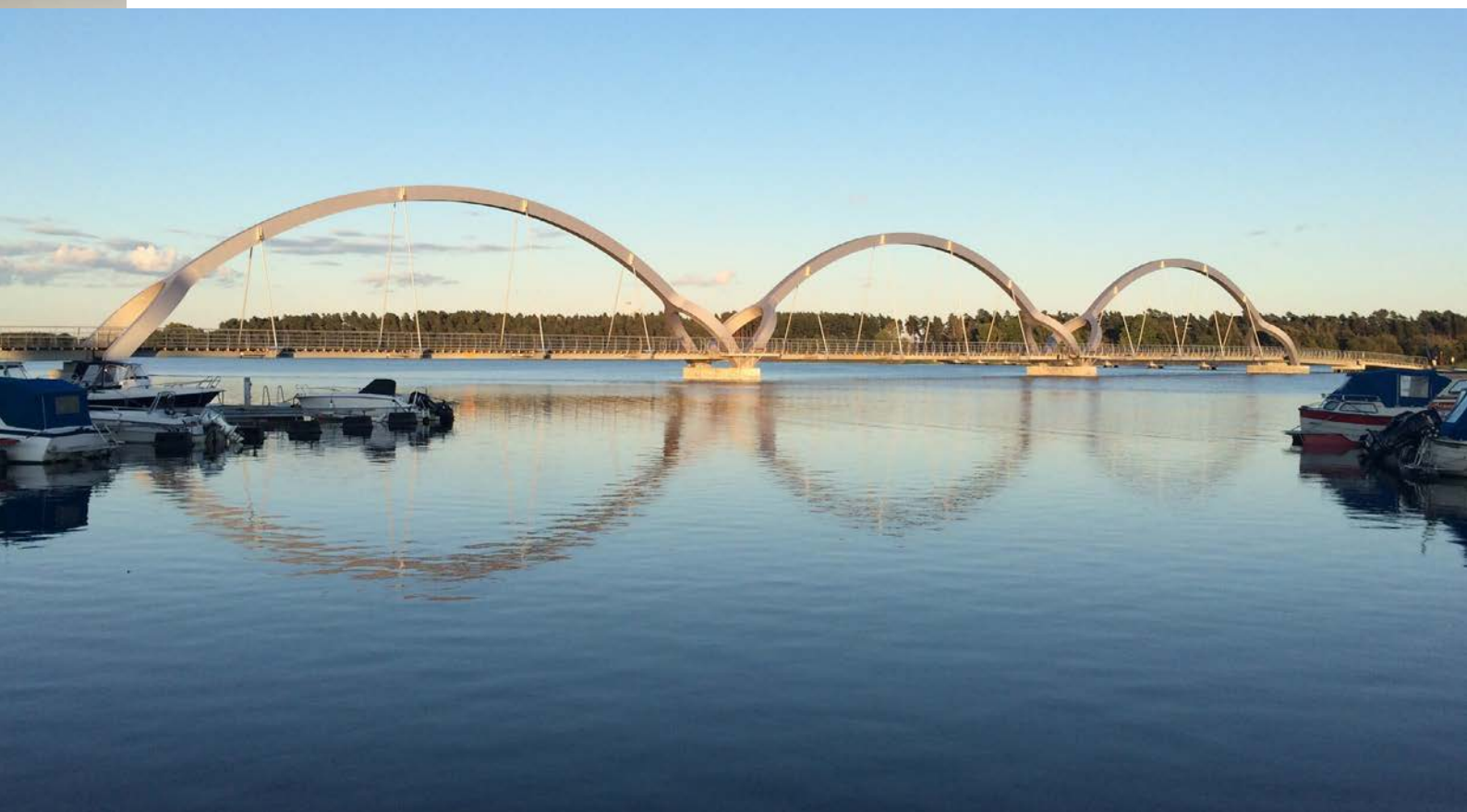


In 2012, the new passing track was put into use in the municipality of Karlshamn in the centre of Blekinge. The investment was very important to enable the operation of train line between Karlskrona and Malmö effectively. Around 2022, a new passing track will be ready near Ronneby to enable a denser service, with two departures every hour.



**BRIDGE FOR CYCLISTS AND PEDSTRIANS BETWEEN THE CENTRE  
OF SÖLVESBORG AND THE RESIDENTIAL AREA LJUNGAVIKEN 2013**

Source: *Wikipedia*



The bridge makes it possible to go to the city and the hub of public transport, to go to other places in the municipality and to reach interregional trains. It was ready to use in 2013.

### BUSTERMINAL AND NEW CITYDISTRICT IN KARLSKRONA 2017

In 2017, the first departure was made from this new bus terminal in Karlskrona. The terminal is used by all buses in Karlskrona and is integrated with the train station to make it easy to change and go by city buses to any part of the city. At the same time, a new city district is under construction, very close to the terminal. This investment will make public transport in Karlskrona even more competitive.

### RENOVATED TRAINSTATION AND NEW BRIDGE IN BERGÅSA

For many years, a busy intersection with cars, bikes and trains was the cause of traffic jams and accidents. In 2014, the station was changed and a bridge for cars and a tunnel for bikes and pedestrians made traveling safer. Cyclists were prioritized to make travel faster and more convenient.

# KLAIPEDA

## PUBLIC TRANSPORT IN KLAIPEDA

Source: *Klaipeda transport*



New route-taxi service was launched on April 16th, 2018 together with new integrated e-ticketing system. Launching of this project finished service integration in Klaipeda, and started implementation of new e-ticketing system which will be finished in October, 2018.  
New 28 small vehicles for city routes (M5, M6 and M8), after 2017 tender procedures and signed contracts with operators, started to provide PT service.



## PUBLIC TRANSPORT IN KLAIPEDA

Source: Klaipeda transport





# POMERANIAN VOIVODESHIP

## POMERANIAN METROPOLITAN

Source: [www.trojmiasto.pl](http://www.trojmiasto.pl)



The first in nearly 40 years railway line in Poland built from scratch. When it was put into operation in 2015, the newly built railway line was 18 km in length and had eight stops and the most advanced railway traffic control and safety systems in Poland. PKM line connected Gdańsk and Gdynia with Lech Walesa Airport and the Kashubian region (Kościerzyna and Kartuszy), and facilitated traveling between the centres of the city and the outskirts. The project has been still under development. In December 2017, another two stops, Gdynia Karwiny and Gdynia Stadion were put into operation. Between 2020 and 2023, the electrification of PKM line is scheduled as well as the construction of another station, Gdańsk Firoga.



TRISTAR system was introduced in Tricity to:

- improve road traffic safety;
- use more effectively the existing road and transport infrastructure;
- reduce congestion within basic network of roads and streets;
- improve monitoring and protection of natural environment;
- provide more effective supervision over particular elements of transport system;
- facilitate road assistance management;
- facilitate transfer of information on transport system operation to drivers and passengers.

### INTEGRATED TRAFFIC MANAGEMENT SYSTEM - TRISTAR

Source: [www.trojmiasto.pl](http://www.trojmiasto.pl)



TRISTAR system has been in operation since November 2015. The system comprises, inter alia: 2226 street signalling, lightning and sound devices, 745 on-board computers with GPS and priority radio transmitters located in collective transport vehicles, 79 supervision cameras, 13 meteorological stations, 15 parking information boards and 32 parking information signs, 23 speeding control recorders, 35 driving-through-red-light recorders, 73 passenger information boards at urban transport stops.

## BRAND NEW TROLLEYBUSES WITH BATTERY DRIVE IN GDYNIA

Source: [www.trojmiasto.pl](http://www.trojmiasto.pl)



In 2018, the Gdynia City Hall signed a contract with Solaris company on the delivery of 30 brand new trolleybuses (14 vehicles Solaris Trollino 12 and 16 articulated vehicles Solaris Trollino 18). Both standard and articulated vehicles will be equipped with traction battery of 58 and 87 KWh capacity respectively. As a result, it will be possible to cover dozens of kilometres outside the overhead contact line. Thanks to such solution the vehicles, which fail to emit any exhaust fumes (just like electric buses) will be able to reach districts with no overhead contact lines installed. Such investment constitutes another step towards the implementation of low-emission transport policy and reduction of adverse impact of transport on the inhabitants' lives in the Pomorskie.

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### METROPOLITAN BICYCLE SYSTEM OMG-G-S

Source: [www.trojmiasto.pl](http://www.trojmiasto.pl)



In 2018, an agreement was signed to provide city bicycle system within Gdańsk-Gdynia-Sopot Metropolitan Area. The system which shall be operational in 14 municipalities, will be the largest system, not only in Europe but also in the world, using only electric bicycles. It will consist of 4080 bicycles (which ranks the system second in Poland) of 4th generation, equipped with GPS and GSM modules.



# QUALITY ANALYSIS OF PUBLIC TRANSPORT SYSTEMS IN PARTNER REGIONS



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## LIST OF STRENGTHS OF PUBLIC TRANSPORT IN REGIONS UNDER ANALYSIS



Region	Strengths
<b>ROSTOCK</b>	<ul style="list-style-type: none"> <li>Integration of public transport</li> </ul>
<b>BLEKINGE</b>	<ul style="list-style-type: none"> <li>High frequency of connections between the capital of the region, Karlskrona and other cities and towns in the region.</li> <li>User-friendly ticketing system compulsory in the whole region.</li> <li>Public transport system very friendly to the natural environment.</li> </ul>
<b>KLAIPEDA</b>	<ul style="list-style-type: none"> <li>Since 2003 every PT route is operating by operators, chosen via public tenders. In 2018 8 operators have 16 contracts with PT authority to provide service of 58 routes.</li> <li>Integrated user-friendly e-ticketing system, numerous list of ticket types and distribution channels</li> <li>Responsibilities are splited among City council (political level), City administration and PT authority.</li> </ul> <p>Wide route network and public transport availability by foot (&lt;500 meters)</p>
<b>POMERANIAN VOIVODESHIP</b>	<ul style="list-style-type: none"> <li>Numerous ticket distribution channels, which translates into easy purchase of tickets by passengers.</li> <li>Modern fleet of vehicles with most of them adapted to the needs of people with difficulties in moving around.</li> <li>Experience in the use of vehicles powered by electric energy (trolleybuses with traction batteries)</li> </ul>
<b>VIIMSI MUNICIPALITY</b>	<ul style="list-style-type: none"> <li>High spatial availability of public transport.</li> <li>User-friendly and attractive e-ticket system.</li> <li>User-friendly price policies (free of charge for students, seniors over 65, discounts for different social groups).</li> </ul>
<b>GULDBORGSUND</b>	<ul style="list-style-type: none"> <li>Good connections to Copenhagen and the rest of Denmark and Germany.</li> <li>Demand-responsive public transport.</li> </ul>



















Source: own elaboration

## ASSESSMENT ON NECESSARY CHANGES

DO YOU THINK IT IS NEEDED?	NOT NEEDED	SLIGHTLY NEEDED	GREATLY NEEDED
Redesigning the public transport network layout			
Adding a route or expanding geographical coverage of public transport			
Enhancing the frequency, reliability or extending operating hours of public transport services			
Improving coordination among modes (e.g. integration of bus schedules with other transport modes)			
Implementation of dynamic traffic management to support e.g. journey planning, traffic regulation, variable message signs and incident management			
Further integration of the tariff and ticketing system			

Source: own elaboration

DO YOU THINK IT IS NEEDED?	NOT NEEDED	SLIGHTLY NEEDED	GREATLY NEEDED
Introducing Demand-Responsive Transport (DRT is a public transport service operated by small buses on demand only, e.g. passengers call the bus by phone)			
Installing high quality waiting area facilities (seats, shelters, convenience services)			
Building or modernizing bicycle infrastructure (e.g. bicycle stands, bike lanes or secure bicycle parking)			
Providing access to other environmentally friendly transport modes, e.g. by offering a bike-sharing service, taxis and carsharing			
Building or modernizing park and ride facilities			
Building car sharing facilities (e.g. electric car chargers, dedicated parking spots for car sharing services)			
Integrating cycling with public transport (e.g. bike racks on buses, bike routes and bicycle parking near transit stops)			
Facilitating access to stations (e.g. pedestrian and bicycle paths, signs, redesign of surrounding space)			
Improving driver training for smooth and energy efficient driving (eco-driving)			

DO YOU THINK IT IS NEEDED?	NOT NEEDED	SLIGHTLY NEEDED	GREATLY NEEDED
Improvements of passenger information (e.g. maps, mobile applications, schedules, contact numbers and other sources of information on how to reach a particular destination by public transport, real-time information on transit vehicle arrival)			
Implementing different information tools that are adapted to people with disabilities (e.g. visual aid systems, vocal announcements)			
Ensuring physical accessibility to waiting area facilities and vehicles (e.g. for prams, pushchairs, wheelchairs, walking frames)			
Implementation of marketing programs (e.g. marketing campaign aimed at encouraging more people to use public transport)			
Improving security for transit users, (e.g. by installing cameras at stops and on vehicles, safety and security training for drivers and/or passengers, creating safer conditions at stations and their surroundings by better lighting)			
Targeted services, such as express commuter buses, and services for special events			
Offering innovative pricing schemes for public transport (e.g. smart cards payment systems)			
Improvements in sustainability and energy efficiency (electrification of urban transport, reducing fuel consumption of the used transport mode, fuel-efficient tyres, fuel-efficient standards, reusable energy sources)			
Giving priority to public transport over private cars (e.g. bus lanes, queue-jumper lanes, traffic lights actuated by public transport vehicles)			



DO YOU THINK IT IS NEEDED?	NOT NEEDED	SLIGHTLY NEEDED	GREATLY NEEDED
Reducing the overall need to travel by maximizing development density in sustainable locations (e.g. town centres or areas close to public transport interchanges)			

Source: own elaboration

Aspects defined by at least four regions as aspects which require change include:

- improving coordination among modes,
- building or modernizing park and ride facilities.

From among six regions under analysis, every three regions indicated that the public transport operating within their areas requires changes which involve:

- further integration of the tariff and ticketing system,
- installing high quality waiting area facilities,
- building or modernizing bicycle infrastructure,
- improving driver training for smooth and energy efficient driving,
- implementing different information tools that are adapted to people with disabilities,
- ensuring physical accessibility to waiting area facilities and vehicles,
- offering innovative pricing schemes for public transport,
- giving priority to public transport over private cars.

It is worth mentioning that fact that only two from the activities under analysis were recognized as unnecessary by more than one region. It means that people responsible for developing public transport and people related to them in the analysed regions are aware of constant development of public transport offer. The people also notice shortages in the current public transport offer.

## SELECTED EXAMPLES OF BEST PRACTICES ON PUBLIC TRANSPORT SOLUTIONS

Region	Strenghts
ROSTOCK	<b>INTEGRATION OF PUBLIC TRANSPORT</b> – experts agree that the integration of public transport should result in improving the quality of services and rationalizing the expenses from public funds incurred on public transport operations. The Region of Rostock has significant experience in this respect. The experience is especially valuable since public transport integration may also generate adverse effects. The integration of public transport may lead to market monopolization (decrease of competition). If competition between operators is decreased, the pressure to maintain or improve the quality of rendered services may cease to exist.
BLEKINGE	<b>USE OF ALTERNATIVE FUELS TO POWER THE FLEET OF PUBLIC TRANSPORT VEHICLES</b> – Growing number of restrictions on natural environment protection and accepted liabilities regarding the reduction of greenhouse gas emissions require changes in the applied technologies for powering the public transport fleet of vehicles. At present, the producers of bus fleet of vehicles are working on developing hybrid, electric, hydrogen and gas power technologies. In the region of Blekinge 96% of public transport vehicles are powered by renewable fuels. Therefore, the fleet of public transport vehicles operating in Blekinge belongs to the European top fleets regarding its friendliness to the environment.
KLAIPEDA	<b>DEVELOPING COMPETITION BETWEEN CARRIERS THROUGH ORGANIZING OPEN TENDERS</b> – As a result of contracts on transport services concluded with carriers under tender procedures the increase in competition between carriers is possible. The competition leads to rationalization of public transport operational expenses and contributes to reducing the volume of subsidies from public funds. In the region of Klaipeda all carriers providing public transport services are selected under tender procedures.
POMERANIAN VOIVODESHIP	<b>MARKETING RESEARCH ON THE INHABITANTS' TRAVEL BEHAVIOUR AND PREFERENCES</b> – in the Pomeranian Voivodeship representative marketing research is concluded regularly by particular operators of public transport. As a result, the inhabitants' travel behaviour and preferences are studied, which helps adapt the public transport offer to their needs and expectations.

Region	Strengths
<p><b>VIIMSI MUNICIPALITY</b></p>	<p><b>FARE-FREE PUBLIC TRANSPORT</b> – Reference literature indicates social, economic and environmental grounds for implementing fare-free public transport. Fare-free public transport is also often introduced for limited time (e.g. implementation of investment), trial period (as research process) or in emergency situations (e.g. flood in Prague in 2002). Therefore, it is usually possible to identify grounds for taking decision on the introduction of fare-free public transport. Estonia, and especially its capital, Tallinn’s indicated as pioneer in providing fare-free public transport services. It is worth mentioning that the introduction of fare-free public transport in Tallinn was preceded by a referendum.</p>
<p><b>GULDBORGSUND</b></p>	<p><b>DEMAND-RESPONSIVE PUBLIC TRANSPORT</b> – Within the whole area of Guldborgsund municipality, every day from 6.00am to 11.00pm demand-responsive public transport is available. The solution helps to increase effectiveness and profitability of public transport through services provided only when the demand is made. Demand-responsive public transport operates best on low population density areas (low/irregular demand) and in the case of passengers with special needs (e.g. people with disabilities). In the municipality of Guldborgsund population density amounts to 68 inhabitants per 1km<sup>2</sup> (Denmark 133.9 inhabitants/km<sup>2</sup>, UE 115 inhabitants/km<sup>2</sup>)</p>





# **WFOŚiGW**

## w Gdańsku

Korzystamy z dofinansowania  
Wojewódzkiego Funduszu Ochrony Środowiska i Gospodarki Wodnej  
w Gdańsku

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