Identifying future scenarios of transport development along Tallinn – Riga – Kaunas corridor

Activity: WP 3 “Commuting Growth Corridors”, Activity 3.4

Version: Final

Date: March, 2019

Drafted by: Riga Planning Region and “STS Consulting, Ltd.”

North Sea Baltic Connector of Regions
Interreg Baltic Sea Region programme 2014–2020

Contents

1. Executive summary

The purpose of this document is to elaborate scenarios of the *transport system development along Tallinn – Riga – Kaunas corridor.*

The scenarios are described in the following aspects:

- Estonia, Latvia and Lithuania together;
- Estonia, Latvia and Lithuania separately;
- Major nodal points.

The developed scenarios are accompanied by cartographic materials, allowing to visually evaluate the state of the transport system.

When developing scenarios the assessment of the value and advantages of the main transport modes and nodal points along Tallinn – Riga – Kaunas commuting growth corridor with a focus on passenger transportation but taking into account also the transportation of cargo was carried out. The report also identifies priority of transport modes and perspective connections with 2nd level nodes and networks.

The report is based on the materials presented in the project paper '*Spatial structure and the transport system along Tallinn – Riga – Kaunas commuting growth corridor'*, as well as on documents related to the development and implementation of the Rail Baltics project and relevant documents in the framework of the NSB CoRe project.

2. Methodology of the study

The study consisting of the following steps has been conducted in the framework of the *Identifying future scenarios of transport development along Tallinn – Riga – Kaunas corridor* report preparation:

(1) Analysis data of report *Spatial structure and the transport system along Tallinn – Riga – Kaunas commuting growth corridor.*

The report was prepared within the framework of the WP 3 "Commuting Growth Corridors", Activity 3.3 concerning North Sea - Baltic corridor Baltics section. As a step for report elaboration a survey of relevant stakeholders from Estonia, Latvia and Lithuania was conducted. 42 representatives from

3 Baltic countries took part in the survey. The responses of its participants allowed to investigate the business needs and labour mobility along the Tallinn – Riga – Kaunas commuting growth corridor.

The questions of the questionnaire were formulated in such a way as to obtain a common stakeholders' understanding of Baltics section main nodal points and connections taking into account all modes of transport (road, rail, air, water) and the needs of business travellers and commuters.

The report presented proposals for a common vision of the main transport modes and connections of the transport corridor with a focus on passenger transportation but taking into account also the transportation of cargo. The proposals were represented graphically.

The data of the report made it possible to assess the advantages and importance of different modes of transport and nodal points of the transport corridor, mainly for passenger transportation but also taking into account the transportation of goods, as well as perspective connections with existing urban transport infrastructure and second level nodes and networks.

During the preparation of the report, a wide analysis of the documents relating to the North Sea – Baltic transport corridor development was also carried out by the traditional methods (desk research, logical structural analysis and SWOT). Studied documents were related to the different levels of Multilevel Transgovernance model: from EU level to national (Estonia, Latvia, Lithuania), regional, local levels, as well as to results of previous studies on transport system development in the Baltic sea region, the Project application form and WP current results.

The obtained data provided information for the preparation of the report in several aspects: Estonia, Latvia, Lithuania together, Estonia, Latvia and Lithuania separately, as well as important nodal points (Tallinn, Pärnu, Riga, Kaunas).

(2) Analysis of *documents related to the development and implementation of the Rail Baltica project*.

Rail Baltica is a key issue that will define the success of the NSB CoRe project. The connection will serve as a backbone for the of transport development along Tallinn – Riga – Kaunas corridor.
The future new RB railway line will function as the main commuting service between the main cities. Location and number of smaller railway stations along the RB line is an important issue from the point of view of regional development.

The evaluation of the effects of the Rail Baltica investment on the spatial structure and the transport system helps to define the roles of all modes of transport between urban nodes and second level nodes along the corridor, and in particular the role of railway transport.

Rail Baltica implementation is in Design Phase now. Based on the correspondence of reality with the developed Rail Baltica Timeline (Design phase and Construction phase) we can consider 3 options for implementation of the project:

- Shrinking option: delays in Rail Baltica development;
- Realistic option: Rail Baltica according to timeline;
- Growth option: integration with 2nd level nodes during Rail Baltica implementation and planning of regional stops.

During the preparation of the report it was important to operatively receive information regarding Rail Baltica development and implementation including presentations at relevant events that reflect the views of various stakeholders, assess the impact of the project on the development of the transport system in general, and the daily passenger mobility within the NSB CNC.

(3) Interaction with project partners and *study of relevant documents in the framework of the NSB CoRe project*.

Close interaction was supposed with the case study on the elaboration of proposals and a spatial vision of Riga Metropolitan Area reflecting the urban-rural dimension of the RB line (GoAs 4.1). This moment is important given the fact that the construction of Rail Baltica was not taken into account in previous development plans and mobility plans in Latvia.

Communication with Estonian project partner City of Tallinn which was responsible for study on identifying future scenarios of passenger transport in Estonia with focus on Rail Baltica regional stops criteria development and *'Analysis of carriage of passengers and the transport system between Tallinn and Riga' r*eport elaboration was also very important for the assessment of the value and advantages of the main transport modes and nodal points within the transport corridor .

Study of VASAB reports, as well as participation in project events were considered as key factors for successful transport system along the NSB CoRe corridor estimation.

(4) Scenario paper preparation.

Based on studying and analyzing the above-mentioned documents, 3 scenarios of possible future solutions for the transport system within the NSB CoRe corridor were created.
The document determines priority modes of transport and main nodal points, as well as provides proposals on solutions for the optimisation of offers and connections between the urban nodes (Tallinn, Pärnu, Riga, Kaunas) and main nodal points / second level nodes located between these urban nodes.

When elaborating scenarios, the developed criteria or a combination of them were used to determine regional stops (second level nodes points). The criteria were founded on today's perspectives, but also taking into account existing planning documents.
Scenario paper also determines suitable connections with existing transport infrastructure and 2nd level transport systems.
The developed materials are presented graphically.

3. Assessment of the value and advantages of the main transport modes and nodal points within the transport corridor

The assessment is based on the Report *'Spatial structure and the transport system along Tallinn - Riga - Kaunas commuting growth corridor',* documents related to the development and implementation of the Rail Baltica project, as well as relevant documents in the framework of the NSB CoRe project.

3.1. Report *'Spatial structure and the transport system along Tallinn – Riga – Kaunas commuting growth corridor'* as a basis for the evaluation

The main document on the basis of which the significance and advantages of various transport modes and nodal points within the transport corridor will be evaluated is the report *'Spatial structure and the transport system along Tallinn – Riga – Kaunas commuting growth corridor'* prepared by the Riga Planning Region and STS Consulting Ltd in the framework of the WP 3 "Commuting Growth Corridors", Activity 3.3 concerning North Sea - Baltic corridor Baltics section. The report considered 24 documents related to the development of the corridor. The analysis of the documents relating to

the North Sea – Baltic transport corridor development was carried out by the traditional methods (desk research, logical structural analysis and SWOT).

Studied documents applied to the different levels of Multilevel TransGovernance model: from EU level to national, regional, local levels in Estonia, Latvia, Lithuania, as well as to results of previous studies on transport system development in the Baltic sea region, the Project application form and WP current results.

Proposals on a common vision of the main transport nodes and connections of the transport corridor with a focus on passenger transportation but taking into account also the transportation of cargo were presented graphically in the report as it shown in the Figure 1 below.

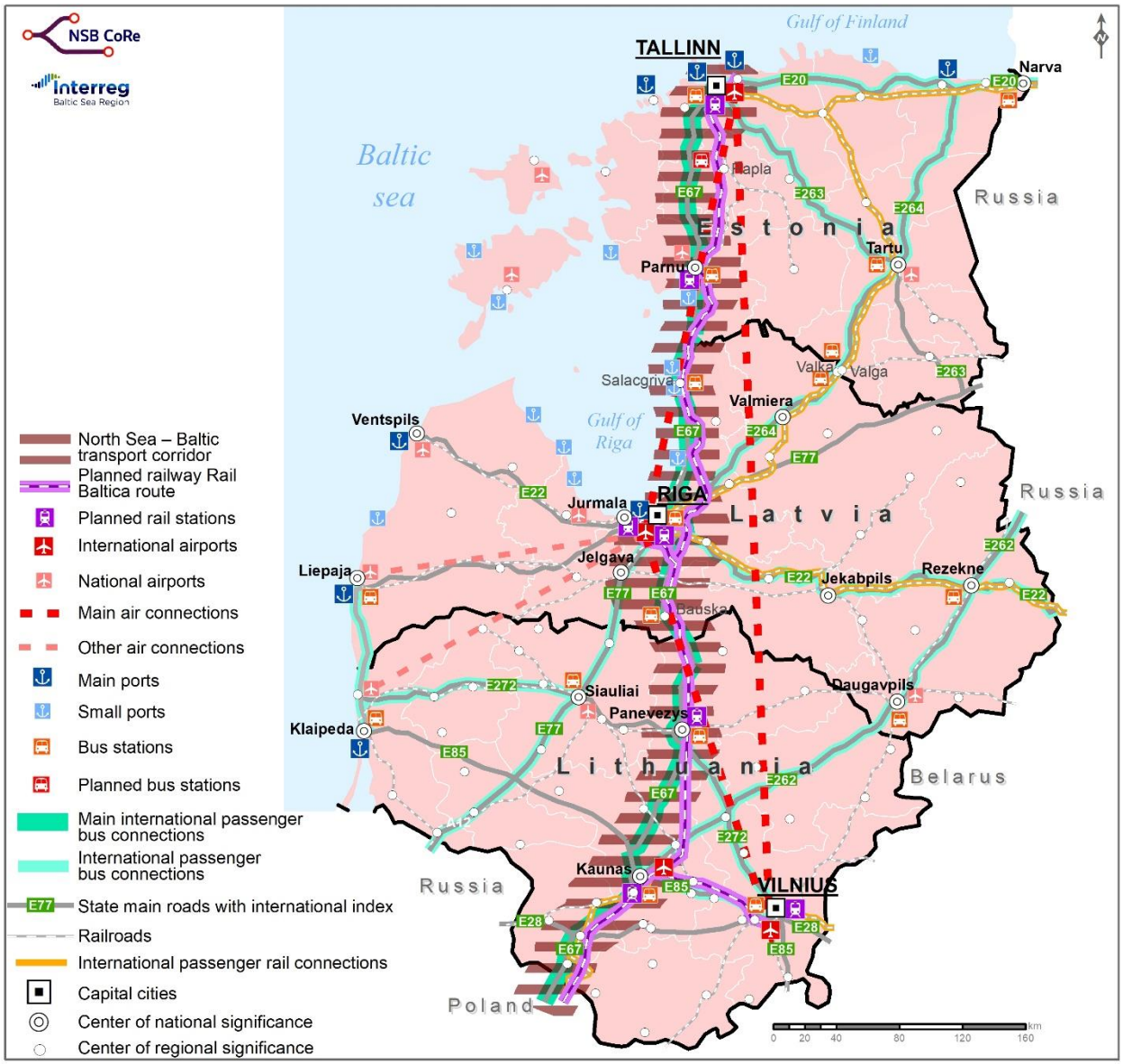


Figure 1. *North Sea – Baltic transport corridor main transport nodes and connections.*

The proposals reflected 4 transport nodes:

Rail: The planned Rail Baltica route and planned railway stations are presented, as well as the existing railway network, where international connections for passenger traffic are noted.

Road: Main and other international passenger bus connections are shown, additionally the main state roads with an international index are marked, as well as existing and planned bus stations.

Air: The map shows the location of international and national airports, as well as routes of international and other air connections.

Sea: The main and small ports of the Baltic countries.

The capitals of the Baltic countries, cities of national and regional importance are also noted.

In order to obtain the opinion of the stakeholders on a wide range of issues related to the development of Tallinn – Riga – Kaunas commuting growth corridor, a questionnaire of 20 questions was developed as a step for report elaboration. The questions were formulated in such a way as to ensure a common stakeholders' understanding of Baltics section main transport modes, nodal points and connections taking into account all modes of transport (road, rail, air, water) and the needs of business travellers and commuters. The processed report's data did it possible to assess the advantages and importance of different modes of transport and nodal points of the transport corridor, mainly for passenger transportation but also taking into account the transportation of goods, as well as perspective connections with existing urban transport infrastructure and second level nodes and networks.

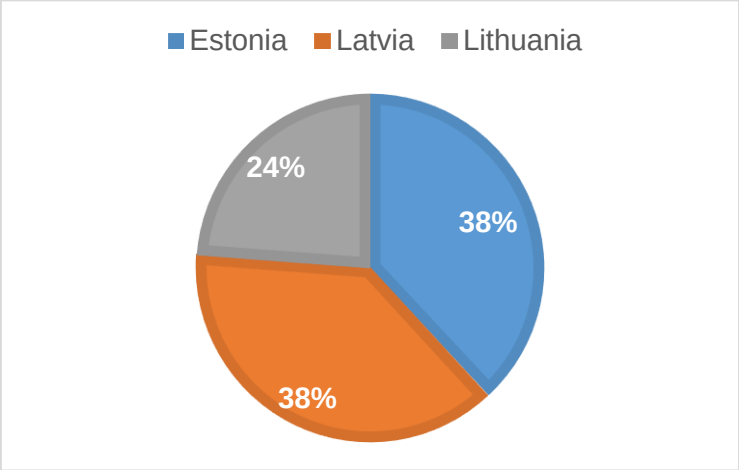


Diagram 1. Share of the representatives from the Baltic States (%)

42 representatives from Estonia, Latvia and Lithuania took part in the survey conducted. They presented international organizations, organizations of state, regional and local (municipality) levels, as well academics, associations and consulting companies.

The share of the representatives of Estonia, Latvia and Lithuania participating in the survey is shown in Diagram 1 above.

The opinion of respondents on issues directly related to the subject of this report is demonstrated below.

Question 3 of the survey offered to specify the current state of respondent's country/region passenger transport system by transportation modes along North Sea – Baltic corridor. Answers were ranged from Very weak to Very good. Stakeholders' responses are categorized in Table 1.

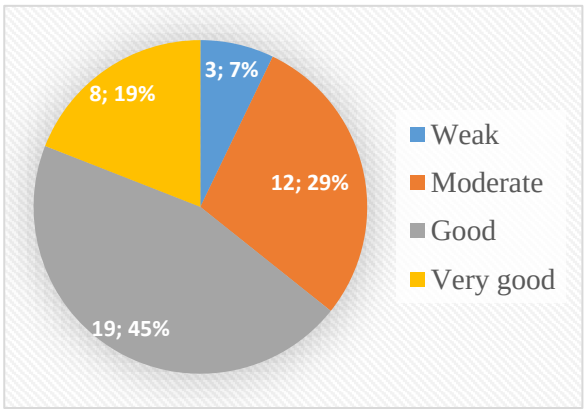
Table 1. Estimation of the current state of respondent's country/region passenger transport system by transportation mode.

Transportation mode	Very good	Good	Moderate	Weak	Very weak	No option
Road	4	21	14	2	1	
Rail	1	2	4	24	8	3
Maritime	4	4	11	10	9	4
Air	7	14	11	5	4	1

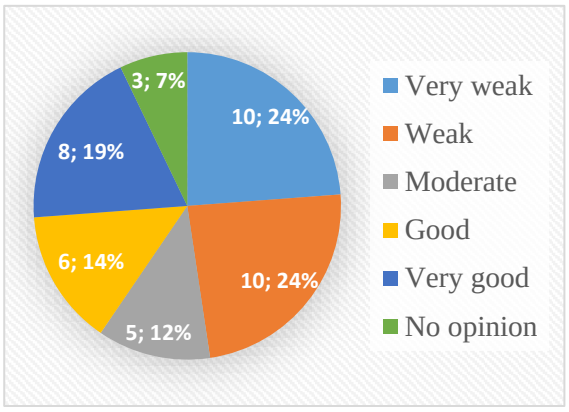
Respondents from 3 Baltic states highly appreciated road transportation mode and rated low rail transportation mode. 75% of the respondents from Estonia and Latvia defined as Weak and Very weak current state of rail transportation mode, respondents from Lithuania were even more categorical – 80% marked low level of the transportation mode. Maritime and air transportation modes we estimated at medium level, at the same time maritime mode was rated lower.

The **first part of the Question 4** asked to define passenger transport modes ensuring fast and convenient *cross-border and international connections along the North Sea – Baltic corridor* from respondent's country/region perspective. Answers were ranges from Very weak to Very good and are presented as follows (see Figure 2).

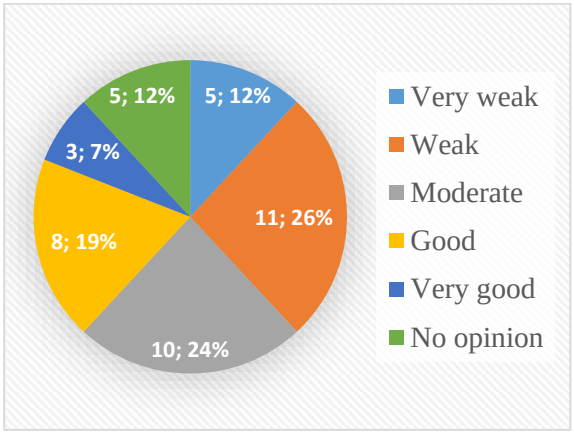
Road (number of responses, share)



Railway (number of responses, share)



Maritime (number of responses, share)



Air (number of responses, share)

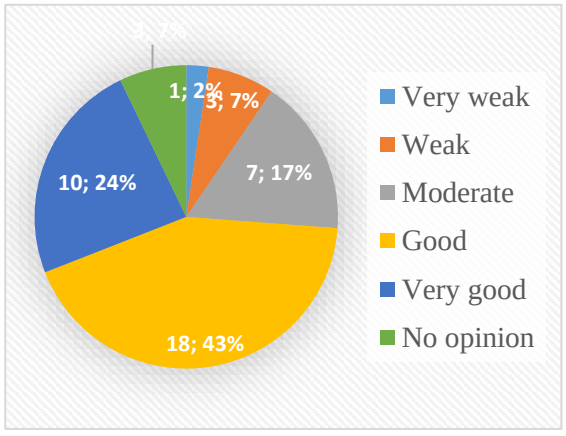
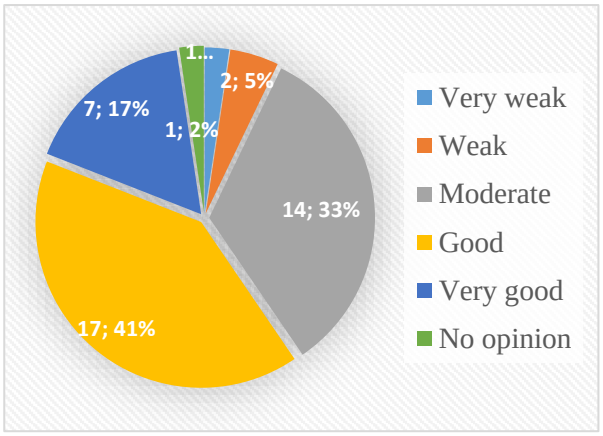


Figure 2. Transport modes ensuring fast and convenient cross-border and international connections.

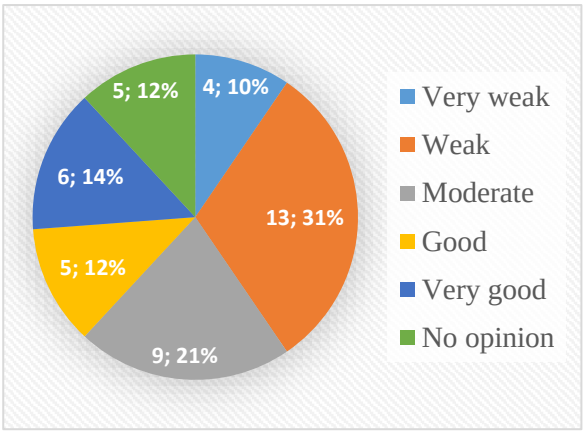
Stakeholders preferred road and air transport modes for this type of connections. 64% of respondents noticed the road mode as Very good and Good and 67% of respondents noticed also the air mode as Very good and Good. Responses relating rail and maritime passenger transport modes were distributed fairly well without significant peaks.

The **second part of the Question 4** offered to define passenger transport modes ensuring fast and convenient *interregional connections (within respondents' country) along the North Sea – Baltic corridor* from their country/region perspective. Answers were also ranges from Very weak to Very good. The responses are presented as follows (see Figure 3).

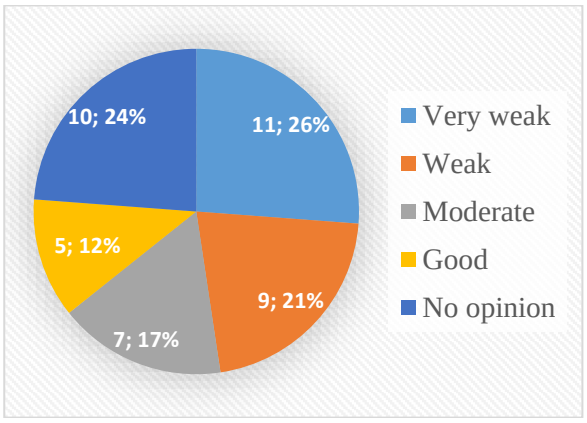
Road (number of responses, share)



Railway (number of responses, share)



Maritime (number of responses, share)



Air (number of responses, share)

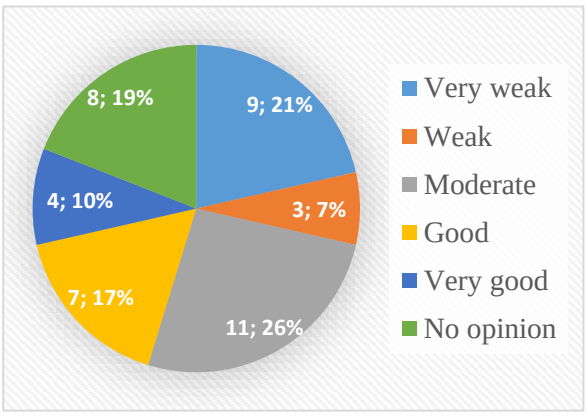


Figure 3. Transport modes ensuring fast and convenient interregional connections.

The road passenger transport mode kept its strong position in interregional connections as well as in cross-border and international connection along the North Sea – Baltic corridor. Less than 10% of survey participants mark the transport mode negatively.

At the same time the air mode lost its leading position: 20 stakeholders or 47,6% of total survey participants marked negatively the mode. The respondents were brave in their negative estimation: 71,4% of them noticed in this way the maritime mode and 52,4% - the rail mode.

Question 5 and 6 of the survey proposed respondents to indicate the most important existing and perspective nodal points for business travellers and commuters on the North Sea – Baltic corridor ***core network*** and ***catchment area*** in Estonia, Latvia and Lithuania. The basic nodal points were

defined and stakeholders we invited to add points. Respondents' opinion was widly indicated in diagrams in '*Spatial structure and the transport system along Tallinn – Riga – Kaunas commuting growth corridor'* report.

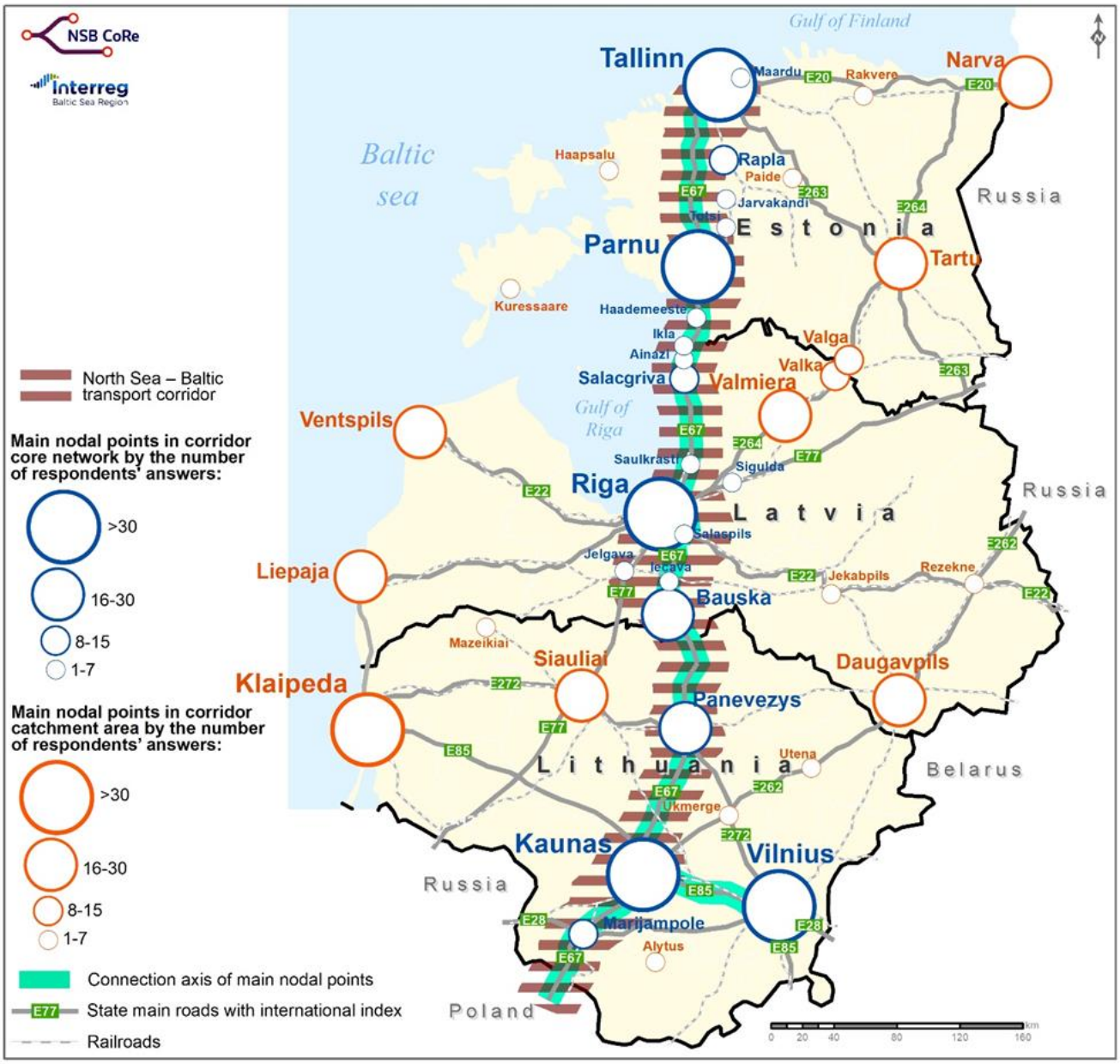


Figure 4. Most important existing and perspective nodal points for business travellers and commuters on the North Sea - Baltic corridor core network and catchment area (by the number of respondents' answers).

At the same time, the obtained data were presented cartographically and demonstrated the most important existing and perspective nodal points for business travellers and commuters on the North

Sea - Baltic corridor core network and catchment area in Estonia, Latvia, Lithuania according to survey respondents (see Figure 4 above).

As the main nodal points on the North Sea - Baltic corridor core network were designated Tallinn, Parnu and Rapla (as perspective) in Estonia; Riga, Bauska (as perspective) and Salacgriva (as perspective) in Latvia; Kaunas, Vilnius, Panevezys and Marijampole (as perspective) in Lithuania. At the same time, as the main nodal points on the North Sea - Baltic corridor catchment network were marked Tartu, Narva, Valga in Estonia; Ventspils, Liepaja, Daugavpils, Valmiera and Valka in Latvia; Klaipeda and Siauliai in Lithuania.

The data in Table 2 reflect the number of inhabitants in the most important existing and perspective nodal points for business travellers and commuters on the North Sea – Baltic corridor ***core network*** in Estonia, Latvia and Lithuania.

Table 2. Number of inhabitants in the most important nodal points on the corridor core network in Estonia, Latvia and Lithuania.

Country	City	Number of inhabitants
Estonia	Tallinn	394,024
	Parnu	44,192
	Rapla (perspective)	9,239
Latvia	Riga	742,572
	Bauska (perspective)*	8,515
	Salacgriva (perspective)*	3,060
Lithuania	Kaunas	374,643
	Vilnius	542,366
	Panevezys	117,395
	Marijampole	47,613

Source: *World Population Review, 2018;*

** - Central Statistical Bureau of Latvia, 2017*

The following table (Table 3) shows the number of inhabitants in the most important existing and perspective nodal points for business travellers and commuters on the North Sea – Baltic corridor ***catchment network*** in Estonia, Latvia and Lithuania.

Table 3. Number of inhabitants in the most important nodal points on the corridor catchment network in Estonia, Latvia and Lithuania.

Country	City	Number of inhabitants
Estonia	Tartu	101,092
	Narva	66,980
	Valga	13,945
Latvia	Ventspils	42,644
	Liepaja	85,132
	Daugavpils	111,564
	Valmiera	26,963
	Valka	5,489
Lithuania	Klaipeda	192,307
	Siauliai	130,587

Source: *World Population Review, 2018.*

Question 8 asked to indicate main existing functionality between the North Sea – Baltic corridor core network main cities in Estonia (Tallinn), Latvia (Riga), Lithuania (Kaunas with extension to Vilnius) and 2nd level nodes located in its surrounding area.

Suggestes answers options were as follows:

- ✓ Residential preferences
- ✓ Mobility and accessibility
- ✓ Health services
- ✓ Tourism / Recreation
- ✓ Public services / Shopping
- ✓ Education
- ✓ Purchasing power and employment
- ✓ Housing
- ✓ Social environment
- ✓ Natural environment
- ✓ Business development

In Estonia as 2nd level nodes were defined cities Paldiski, Keila, Saue, Kehra and Maardu. In Latvia – Tukums, Jelgava, Ogre and Sigulda. In Lithuania – Jonava, Kedainiai, Elektrenai, Lantvaris, Prienai and Garliava.

Table 4 below demonstrates the number of inhabitants in 2nd level nodal points in Estonia, Latvia and Lithuania.

Table 4. Number of inhabitants *in 2nd level nodal points in Estonia, Latvia and Lithuania.*

Country	City	Number of inhabitants
Estonia	Paldiski **	3,806
	Keila	9,411
	Saue **	5,810
	Kehra **	5,624
	Maardu	16,630
Latvia	Tukums	18,348
	Jelgava	61,791
	Ogre	26,760
	Sigulda *	11 376
Lithuania	Jonava	34,993
	Kedainiai	31,980
	Elektrenai ***	13,664
	Lentvaris ***	11,105
	Prienai ***	9,867
	Garliava ***	13,423

Source: *World Population Review, 2018;*

** - Central Statistical Bureau of Latvia, 2017;*

*** - Statistics Estonia, 2018*

**** - Statistics Lithuania, 2017*

In Estonia for all suggested cities as the main existing functionality more that 35% of respondents defined *Labour mobility / Business relations*. Only for Paldiski 19% of stakeholders marked also *Tourism / Recreation* as existing functionality. Another nodes took less than 10% of responses number.

Labour mobility / Business relations is important for Tukums (36%), Jelgava (33%) and Ogre (40%) in Latvia. Almost 29% of respondents noticed *Education / Culture* as the existing functionality for Jelgava and 52% - *Tourism / Recreation* for Sigulda.

Labour mobility / Business relations was noticed as the leading position for all mentioned Lithuanian cities: from 40% for Jonava till 21% for Prienai. The remaining positions are insignificant excluding *Education/Culture* for Kedainai (12%) and *Tourism/Recreation* for Prienai.

Several questions of the questionnaire concerned trends in the development of the intensity of cargo flows.

Question 10 proposed to specify respondents' country/region needs for development of cargo transportation infrastructure. Answers were ranged from Very weak to Very important (from 1 to 5).

Answers' results are presented in Diagram 2.

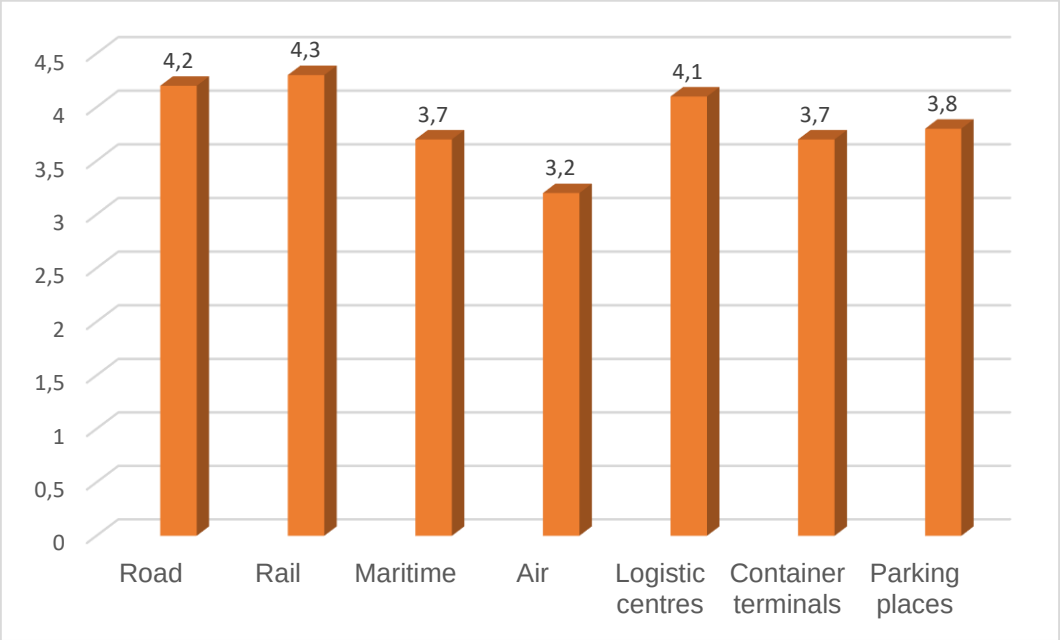


Diagram 2. Respondents' country/region needs for cargo transportation infrastructure (average-weighted coefficient).

As the largest needs for cargo infrastructure development along North Sea – Baltic transport corridor are defined rail and road connections improvement as well as logistic centres/hubs construction. Respondents from the three Baltic countries have differently assessed the most relevant need and importance of improving the railway connection. Respondents from Estonia defined the need only

with average-weighted coefficient 3,9, respondents from Latvia noticed coefficient 4,3 and Lithuanian stakeholders very high estimated the need – 4.9.

Question 11 asked respondents to estimate new opportunities for multimodal logistics development in their country/region. Survey participants' answers were distributed as presented in Diagram 3.

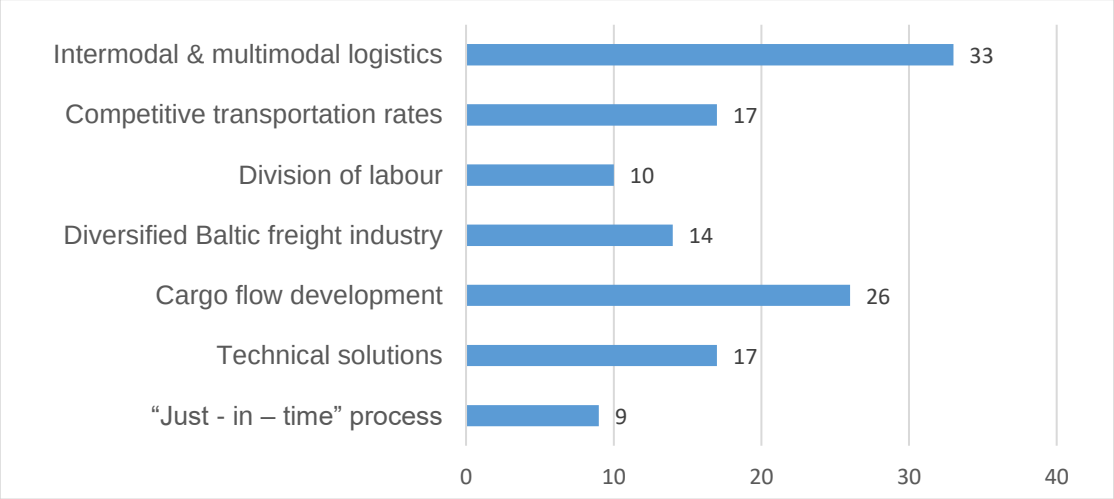


Diagram 3. New opportunities for multimodal logistics development (number of respondents).

78,6% of respondents estimated as the best new opportunity Intermodal and multimodal logistics, 62,0% stakeholders marked Cargo flow development and the third position of the list is divided by Competitive transportation rate and Technical solutions (40,5% of respondents).

The survey's questions also touched upon the issues of *the Rail Baltica* project and assessed its impact on the economic development of countries/regions, determined its stimulation effect on the sustainable economic development, as well as estimated the employment and education opportunities encouraged by the Rail Baltica project.

Question 14 asked stakeholders to express their opinion how Rail Baltica project will stimulate the economic development in the country/region. Answers were ranged from Very weak to Very important (from 1 to 5). Respondents' opinions are presented in Diagram 4.

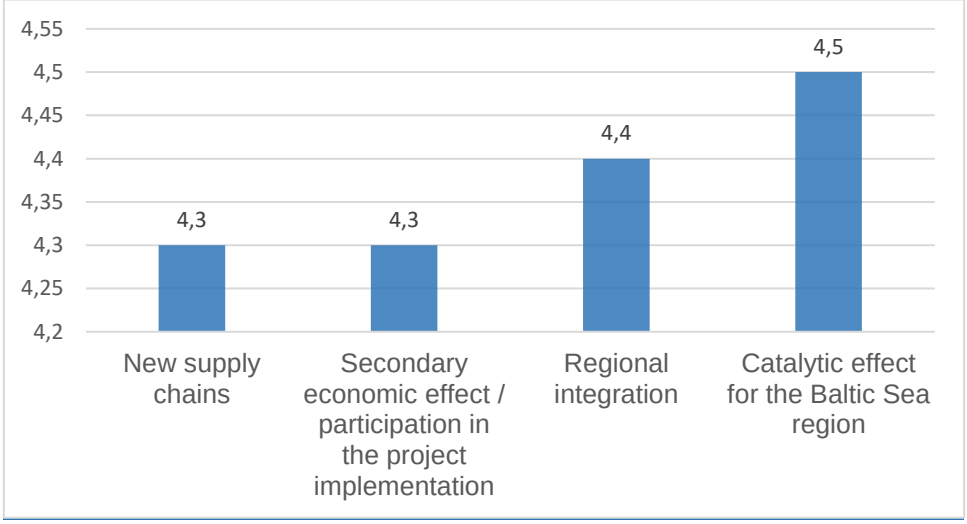


Diagram 4. Respondents' opinion on how Rail Baltica project will stimulate the economic development in the country/region (average-weighted coefficient)

All suggested answer options were highly indicated by respondents. On the average all responses were rated more that Important and Catalytic effect for the Baltic Sea region was marked even between Important and Very important. 44% of respondents from Estonia, 56% of respondents from Latvia and 30% of Lithuanian stakeholders noticed the position as Very important.

Question 15 suggested stakeholders to estimate the *Rail Baltica project* stimulation effect on the sustainable economic development. Survey participants' estimation is reflected in Diagram 5.

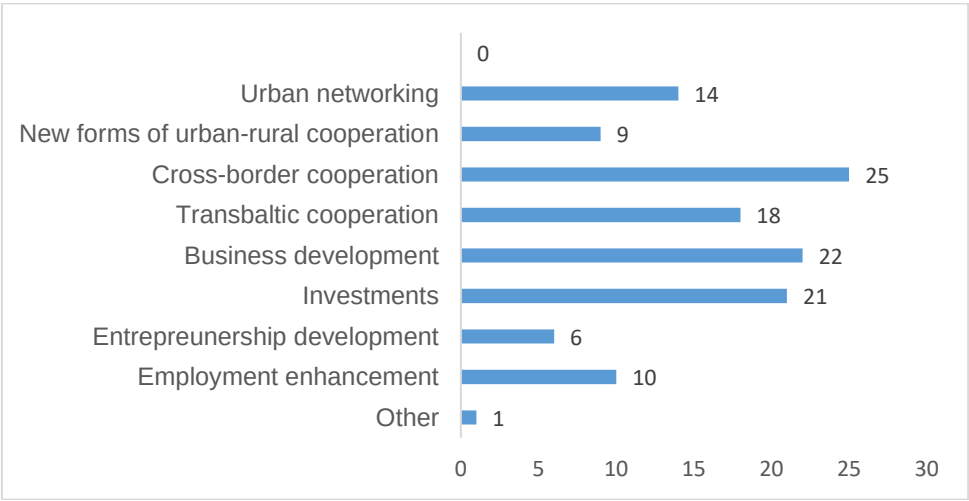


Diagram 5. The Rail Baltica stimulation effect on the sustainable economic development (number of responses).

Cross-border cooperation, Business development and Investments are mentioned by stakeholders as the main positions influenced by the Rail Baltica project development. In total more than 50% of respondents marked them: 59,5%, 52,4% and 50,0% of respondents accordingly. In the same time only 40,0% of stakeholders from Lithuania identified Cross-border cooperation in their responses compared to 62,5% (Estonia) and 68,9% (Latvia). Answer Mobility services was added as Other one.

Question 17 proposed to estimate main social benefits from the Rail Baltica project implementation. Answers were ranged from Very weak to Very important (form 1 to 5). Results are presented in Diagram 6.

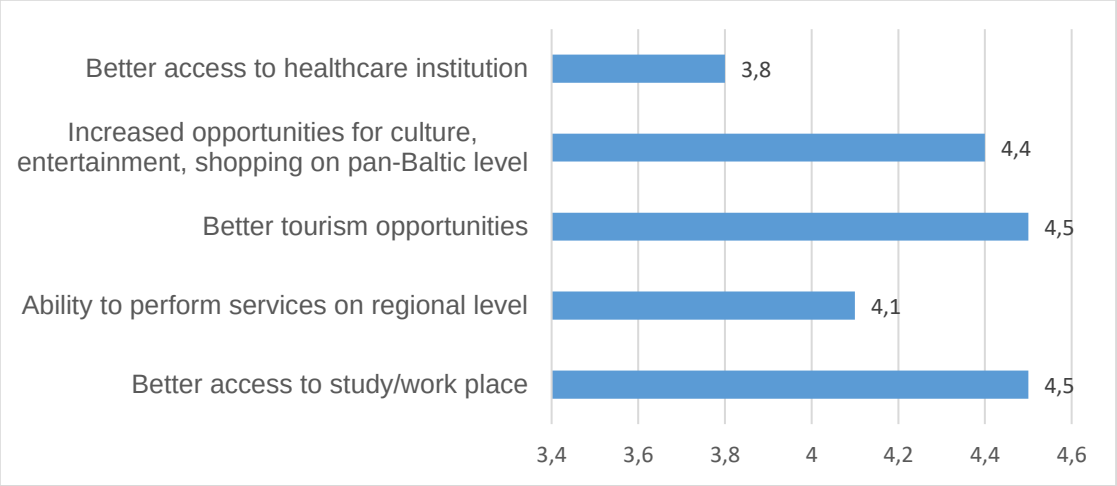


Diagram 6. Social benefits from the Rail Baltica project implementation (average-weighted coefficient).

3 variants of responses *Better access to study/work place, Better tourism opportunities* and *Increased opportunities for culture, entertainment, shopping on pan-Baltic level* were estimated be stakeholders practically at the same high level: at the average between Important and Very important. Suggested response Better tourism opportunities was noticed as Important or Very important by 91% of respondents, response Better access to study/work place – by 81% of respondents and response Increased opportunities for culture, entertainment, shopping on pan-Baltic level by 76% of survey participants.

During the report preparation collection of data on traffic flows, passenger mobility, trends in the intensity of passenger flows along the North Sea - Baltic transport corridor was carried out on the base of statistics from transport industries of the Baltic states for 4 modes of transport: air, sea, rail and road. Analysis of data was processed by quantitative statistics method.

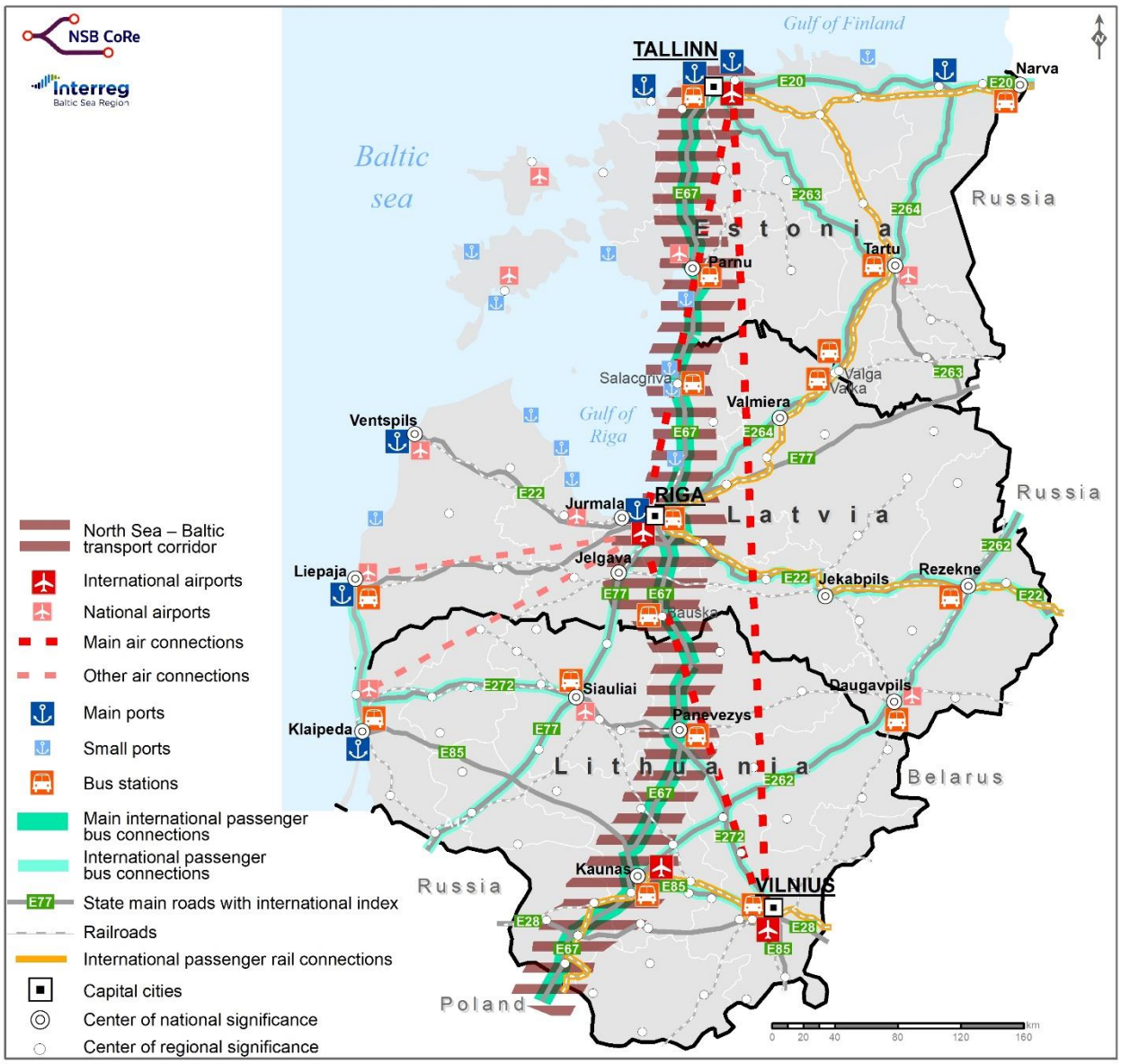


Figure 5. Existing transport connection along the North Sea - Baltic transport corridor.

The information received demonstrated the fact that at present the main migration of passengers, both between the capitals of the three Baltic countries, and between the capitals and the 2nd level nodal points, is carried out by road. Existing transport connection along the North Sea - Baltic transport corridor is demonstrated in the Figure 5 above.

3.2. Rail Baltica as a backbone for the transport system development along Tallinn – Riga – Kaunas corridor

The Rail Baltica project (see a map in Figure 6) is a key issue that will define the success of transport system along Tallinn – Riga – Kaunas commuting growth corridor' development. The future new Rail Baltica railway line will function as the main commuting service between the main cities. At the same time, location and number of smaller railway stations along the Rail Baltica line is an important issue from the point of view of regional development.

Figure 6. Rail Baltica map: Estonia, Latvia, Lithuania.

Source: *Official website of the Rail Baltica Global Project*

The Rail Baltica project implementation timeline both general and separately for all Baltic countries presented in the Figure 7.

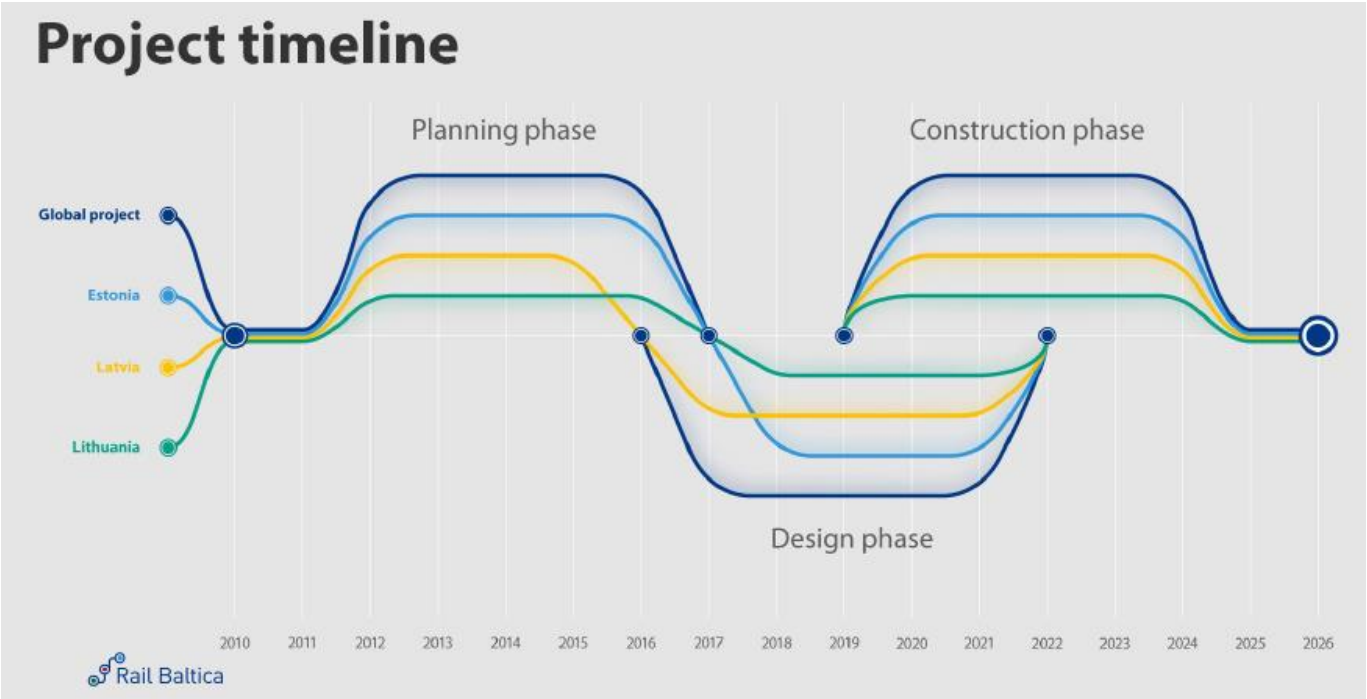


Figure 7. Rail Baltica project timeline.

Source: "*Rail Baltica – project of the Centure", Kaspars Rokens, COO, Management Board Member, RB Rail AS.*

Rail Baltica implementation is in Design Phase now. Based on the correspondence of reality with the developed Rail Baltica Timeline (Design phase and Construction phase) it makes sense to consider 3 options for implementation of the project:

- Shrinking option: delays in Rail Baltica development. As an option due to the reduction in the share of European co-financing;
- Realistic option: Rail Baltica according to timeline;
- Growth option: integration with 2nd level nodes during Rail Baltica implementation and planning of regional stops.

The evaluation of the effects of the Rail Baltica investment on the spatial structure and the transport system helps to define the roles of all transport modes between urban nodes and second level nodes along the corridor, and in particular the role of railway transport.

Figure 8 provides information on the passenger flow as part of the Rail Baltica project development.

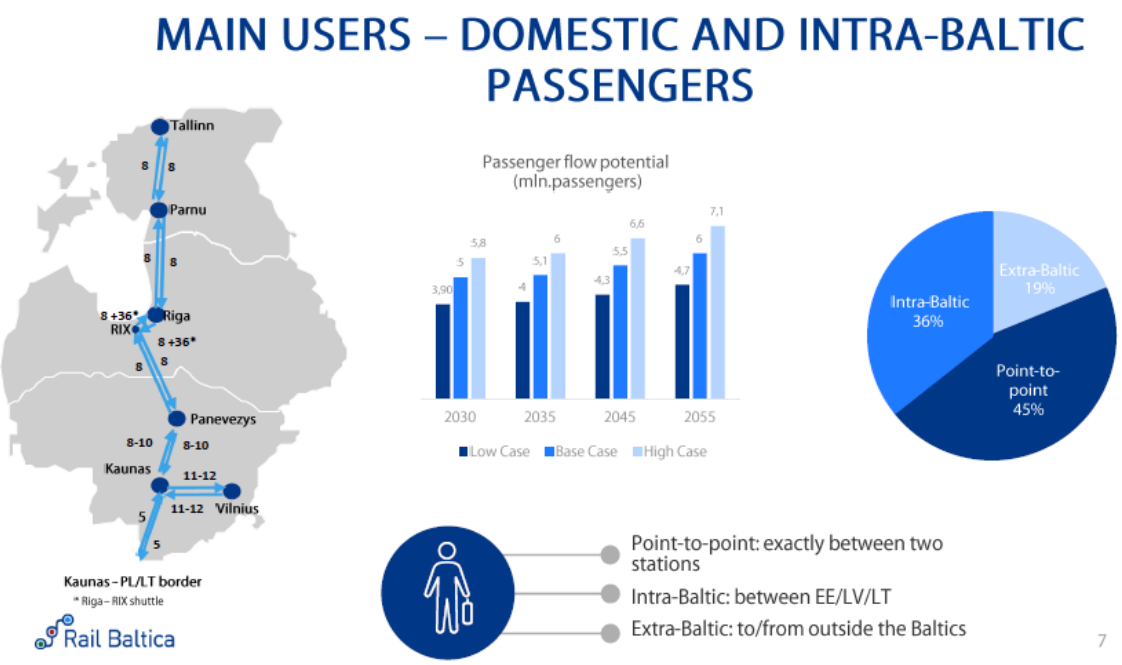


Figure 8. Main users of Rail Baltica.

Source: "*Rail Baltica – project of the Centure", Kaspars Rokens, COO, Management Board Member, RB Rail AS.*

According to the information presented in April 2018 at the conference in Helsinki, the implementation of the Rail Baltica project will lead to a change in the priority of transport modes in the Baltic region. Despite the fact that in 2030 road transport will remain a priority in the region, rail transport will significantly strengthen its position as public transport both through the implementation of Rail Baltica and connections along it, and the development of rail connections with small railway stations. (see Figure 9 below)

At the same time, the Rail Baltica project implementation makes it possible to change priorities in transport modes in cargo transportation. The following Figures 10 and 11 below show the advantages of freight transportation by rail over road and sea transportation, as well as the support for intermodality/multimodality provided by the project.

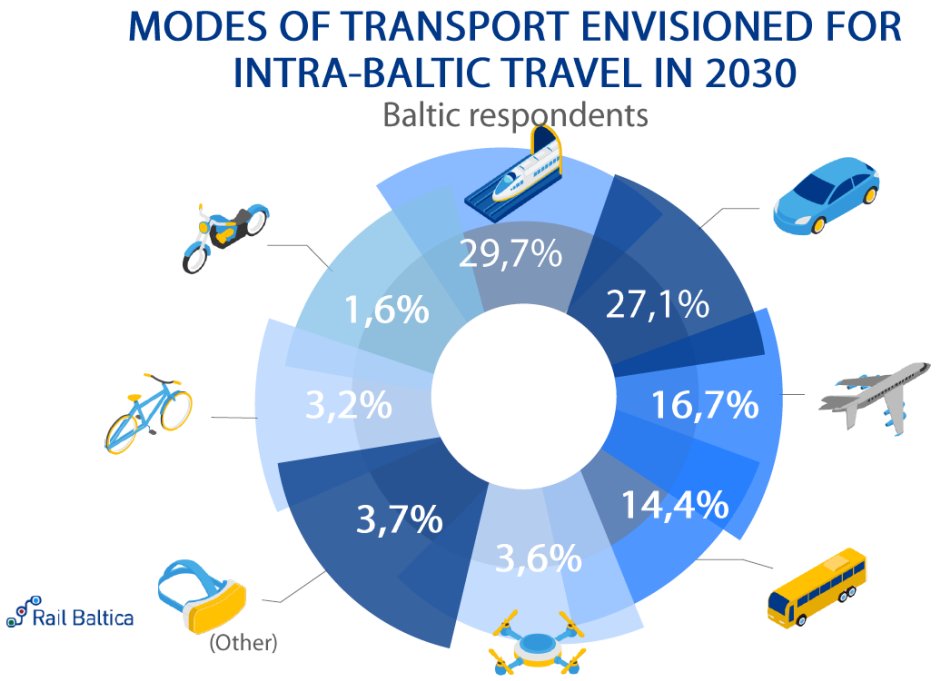


Figure 9. Modes of transport envisioned for intra-Baltic travel in 2030.

Source: *Baiba Andra Rubesa, Chairperson, Management Board, RB Rail AS, Helsinki, April 10, 2018.*

Figure 10. Rail Baltica freight advantages.

Source: "*Rail Baltica – project of the Centure", Kaspars Rokens, COO, Management Board Member, RB Rail AS.*

Figure 11. Intermodality/ Multimodality: special role of Rail Baltica.

Source: "*Rail Baltica – project of the Centure", Kaspars Rokens, COO, Management Board Member, RB Rail AS.*

Rail Baltica project will also identify the main social benefit from project implementation (Figure 12.)

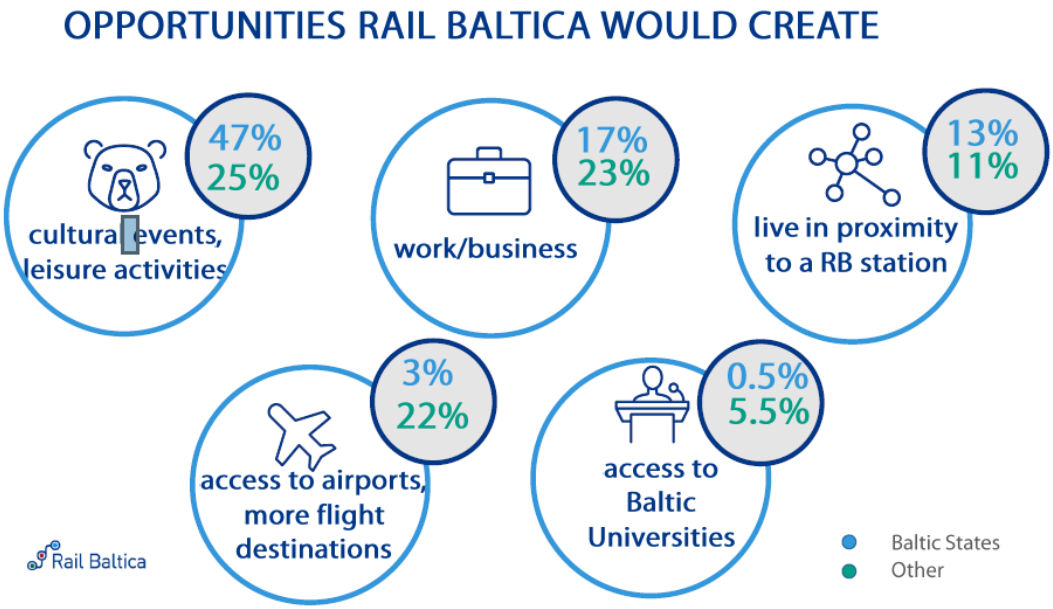


Figure 12. Rail Baltica: opportunities and social benefits.

Source: "*Rail Baltica – project of the Centure", Kaspars Rokens, COO, Management Board Member, RB Rail AS.*

3.3. Study of project partners' relevant documents

VASAB

VASAB report *"Summary of needs and bottlenecks in the NSB CoRe project area"* defines the main conclusions regarding Central Area (Estonia –Latvia-Lithuania):

- Rail Baltica railway with intermodal passenger and freight terminals is a key issue that will define the success of the NSB CoRe development. This connection shall serve as a backbone for the corridor;
- The cooperation within the NSB corridor between Estonia, Latvia, Lithuania and Poland is the weakest;
- There is a need for extensive cooperation of main urban nodes to form polycentric city-region network;
- There is a need to consider re-establishment of cross-border passenger railway services to 2nd level cities e.g. Riga-Siauliai, Vilnius-Daugavpils, Tartu-Riga.

In order to strengthen the cooperation of partners from the Central Area, the Workshop on Accessibility needs along and beyond the North Sea-Baltic corridor was organised by VASAB in Kaunas, Lithuania, on 08.02.2018. One of the topics of the workshop, on which the discussion was organized - identification of the 2nd level connections.

The workshop participants identified the following 2nd level nodal points in Lithuania: Siauliai, Palanga, Klaipėda, Rukla.
Rukla and Siauliai were chosen as important 2nd level nodal points because of national defense. The NSB corridor should be easily reached from these two points.
In addition, they also noted 2nd level nodal points in Latvia: Daugavpils and Liepaja.

Workshop participants used a different approach in identifying 2nd level nodal points as compared to a survey of relevant stakeholders conducted by Riga Planning Region and STS Consulting Ltd. In this case, they considered as 2nd level nodal point the cities which were marked as the most important existing and perspective nodal points for business travellers and commuters on the North Sea – Baltic corridor catchment network in Estonia, Latvia and Lithuania in the survey.

The road from Kaunas to Klaipėda was marked by them as the 1st level connection due to this route is a vital for cargo transportation to or from Klaipėda sea port. As the 1st level connection was also defined the route Siauliai – Panevėžys connecting two Lithuanian large cities.
The route Klaipeda – Palanga was designated as a 2nd level connection, since Palanga is a famous resort.
Cross-border 2nd level connections should be Klaipėda-Liepaja, Vilnius-Daugavpils.

CITY of Tallinn

The purpose of the report *Analysis of carriage of passengers and the transport system between Tallinn and Riga* provided by the partner was to determine the impact of Rail Baltica on the development of the Estonian transport system and the pendulum migration between the main nodes of the Estonian transport corridor (including Tartu and Ida-Viru county / Narva), and also to study connections with nodes of the second level.

In preparing the report, certain limitations were taken: only the Rail Baltica route between Tallinn and the Estonian-Latvian border was considered, when assessing the impact of Rail Baltica on transport connections, only alternative transport modes and connections that compete with Rail Baltica on the international route were taken into account. In addition, as the main points of the Estonian transport corridor were considered only Tartu and Ida-Viru county / Narva, based on a higher population density in these regions, sea routes were not identified as competitors for Rail Baltica. The results and conclusions are mainly based on the estimations provided by experts and are not based on a large-scale data analysis as it mentioned in the report.

Initially, the report identified the *main factors that in combination influence the use and development of rail transport*. *First of all,* according to the authors, these are *preferences of local residents in the use of private or public modes of transport*. The use of private transport is facilitated by factors such as developing ridesharing, introduction of self-driving vehicles, growth of renewable fuel use as well as the advantages of private transport over public transport, e.g. privacy and opportunity and freedom to go to the preferred destination at a time suitable for you. On another hand, private transport use may be limited in future mainly due to high costs (fuel, taxes, parking).

Further, the materials consider the issue of *ticket prices for rail and road transport*, which is relevant when choosing a mode of transport. According to partners, in 2018 the prices of tickets on the suburban lines are close to the prices of bus tickets and cannot be a decisive factor when choosing a mode of transport. At the same time, the difference in the price of train tickets on a regular line and express line on long distance lines is on an average 25%.

Travel time and frequency of departure of trains plays an important role in determining the potential number of Rail Baltica regional trains' passengers. The unsatisfactory frequency of trains departure may push passengers to the choice of an alternative mode of transport, therefore it is extremely important to ensure the frequency of train departure that will cover the needs of passengers from various nodal points.

As the next factor influencing the development of rail transport, *its competition with the modes of transport operating* on the same trajectory was determined. The biggest competitors to the international Rail Baltic high-speed line are Tallinn-Riga train line, Tallinn-Riga bus line and Tallinn-Kaunas bus line. A good passenger transport service on the Rail Baltic route and its connections with another Estonian nodal points influences the number of passengers on both the Rail Baltic high-speed line and regional line. This means that a clear competitive advantage must be created for the Rail Baltic regional trains over the competing lines by favourably combining the ticket price, travel time, departure frequency and convenience. In addition, the report considers the aspect of *amount of the infrastructure use fee* and the size of support allocated by the state.

Further, the report produced the *analysis of perspective development of Rail Baltica transport corridor and suggestions for using it for the regional passenger transport service.* The Rail Baltic train line is primarily planned as a high-speed line. In addition, it is possible to begin operating a regional train on the Rail Baltic route that would stop near 10 nodal points in Harju, Rapla and Parnu counties. Proposals for the perspective development of Rail Baltic and suggestions for the potential operation of the Rail Baltic railway for regional passenger transport service presented the concrete points in the counties:

- Harju county: Assaku, Luige, Saku and Kurtna;
- Rapla country: Kohila and Järvakandi;
- Parnu county: Kaisma, Tootsi, Kilksama and Häädemeeste.

Taking into account perspective changes in the population and its density in the region, the location of the stops in the settlements around the Rail Baltic route can be estimated further.

The factors impacting the demand for the regional train line are primarily the changes in the size of population living next to the Rail Baltic train corridor, urbanisation and suburbanisation trends, as well as daily migration trends which are closely connected with the availability and location of suitable workplaces.

When planning the regional train transport in the Rail Baltic train corridor it is necessary to take into account current conditions there is a well-functioning train connection between Tallinn and Rapla,

which has an advantage of having the train stops located in the cities, while the Rail Baltic train corridor will pass them, as well as a bus connection between Tallinn and Parnu, which could take some of the potential Rail Baltic regional train passengers should it have an advantage in the ticket price or travel comfort. During positioning the local stops for the Rail Baltic regional train it is important to provide a well-functioning and convenient pre-carriage system, which would allow the passengers to easily get to and leave the Rail Baltic train corridor.

The next chapter of the report is devoted to the *connection between the Rail Baltic transport corridor nodes and other Estonian important zones.* The report analyzed the connection possibilities of Ida-Viru county / Narva with the Rail Baltic transport corridor. As a preferred option, the option of a railway connection via Tallinn was considered, since it has advantages over travel time. At the same time, it is noted that if the bus connection along the route Narva -Tartu - Riga is improved, this connection may have an advantage for residents for whom the ticket price is important.

The inhabitants of Tartu now have a good connection with the Rail Baltic transport corridor via Tallinn, Parnu and Riga. It is assumed that the residents of Tartu will prefer direct traffic to Rail Baltica in Riga, in this case it is important to develop the Tartu – Valga - Riga rail connection**.**

In other Estonian regions, it is important to provide a regular well-functioning local bus transport that would have arrival times in Parnu and Tallinn which are compatible with the departure times of Rail Baltic.

Impact of Rail Baltic on other modes of public transport – is the topic of the final chapter of the report. In this part of the paper, partners assessed the competitiveness of international buses and flights connections compared to the Rail Baltic high speed train route. The use of different transport modes will in future depend on the composition of the following factors: primarily the travel time, suitability of the departure times, possibilities to continue the travels, ticket price and travel comfort. At the same time, air transport will have the largest impact for the Tallinn – Vilnius route.

Rail Baltic high speed train line will also play important role for the international bus routes between Tallinn-Riga and Tallinn-Kaunas development. The train has an advantage in speed, but in this case the ticket price will be important. Tourists from Asia, Russia and cruise ships passengers are also considered as potential users of the Rail Baltic train line.

4. Tallinn – Riga – Kaunas transport corridor development scenarios' description

BALTICS level: Estonia, Latvia and Lithuania

As a basis for the scenario of the Tallinn – Riga – Kaunas transport corridor development in the *context of the three Baltic countries* serves a cartographic material, developed during the preparation of the report '*Spatial structure and the transport system along Tallinn – Riga – Kaunas commuting growth corridor'*. The material is shown in the Figure 1 *North Sea – Baltic transport corridor main transport nodes and connections* above. (page 7).

In addition to the planned stops of the Rail Baltica route marked in this figure in Estonia (Tallinn, Pärnu), Latvia (Riga, Riga Airport) and Lithuania (Kaunas, Vilnius, Panevezys), the following perspective stops in three Baltic countries are also to be noted: Rapla in Estonia, Salacgriva and Bauska in Latvia, as well as Marijampole in Lithuania.

In the figure, the following cities are designated as the most important existing and perspective nodal points on corridor catchment area:

- Estonia: Tartu, Narva, Valga.
- Latvia: Ventspils, Liepaja, Daugavpils, Valmiera, Valka
- Lithuania: Klaipeda, Siauliai, Palanga.

The map showing the transport system of Estonia, Latvia and Lithuania together (Figure 13) also demonstrates and defines the main transport connections as well as cross-border connections, namely Narva - Tartu - Riga, Klaipeda - Liepaja and Daugavpils - Vilnius.

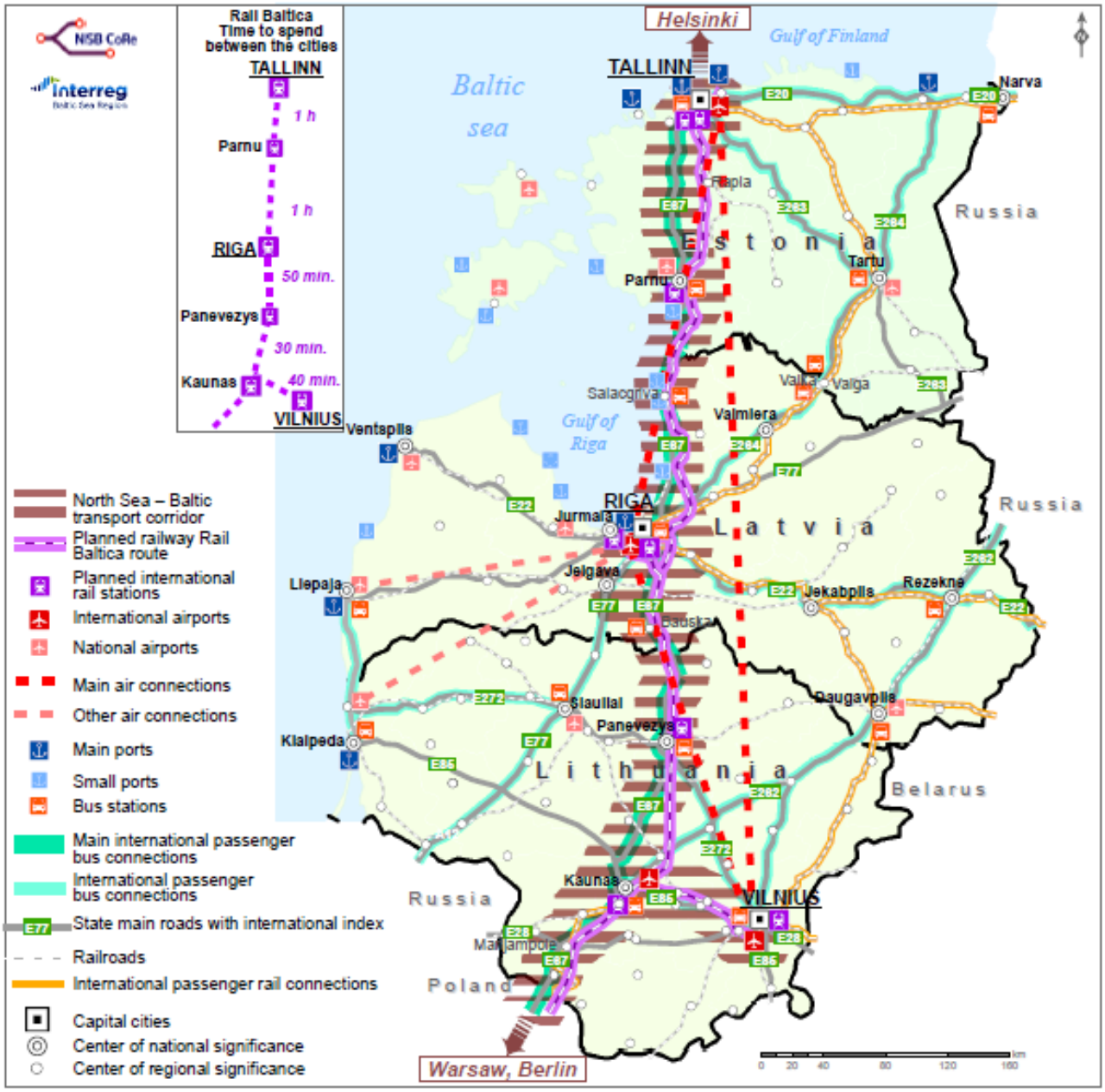


Figure 13. *Tallinn – Riga – Kaunas transport* corridor in the context of *the three Baltic countries* (with extension to Vilnius) development scenario (realistic).

COUNTRY level

When creating development scenarios for the Tallinn – Riga – Kaunas transport corridor, *separately for Estonia* (Figure 14)*, Latvia* (Figure 15)*, and Lithuania* (Figure 16), it was proposed to prepare enlarged cartographic materials for each country in the style of the cartographic material presented in Figure 4 *Most important existing and perspective nodal points for business travellers and commuters on the North Sea - Baltic corridor core network and catchment area (by the number of respondents' answers)* (page 12).

In this case, the Rail Baltic route is presented separately for each of the Baltic countries. Planned and perspective stops are marked, as well as the number of inhabitants in these cities is indicated.

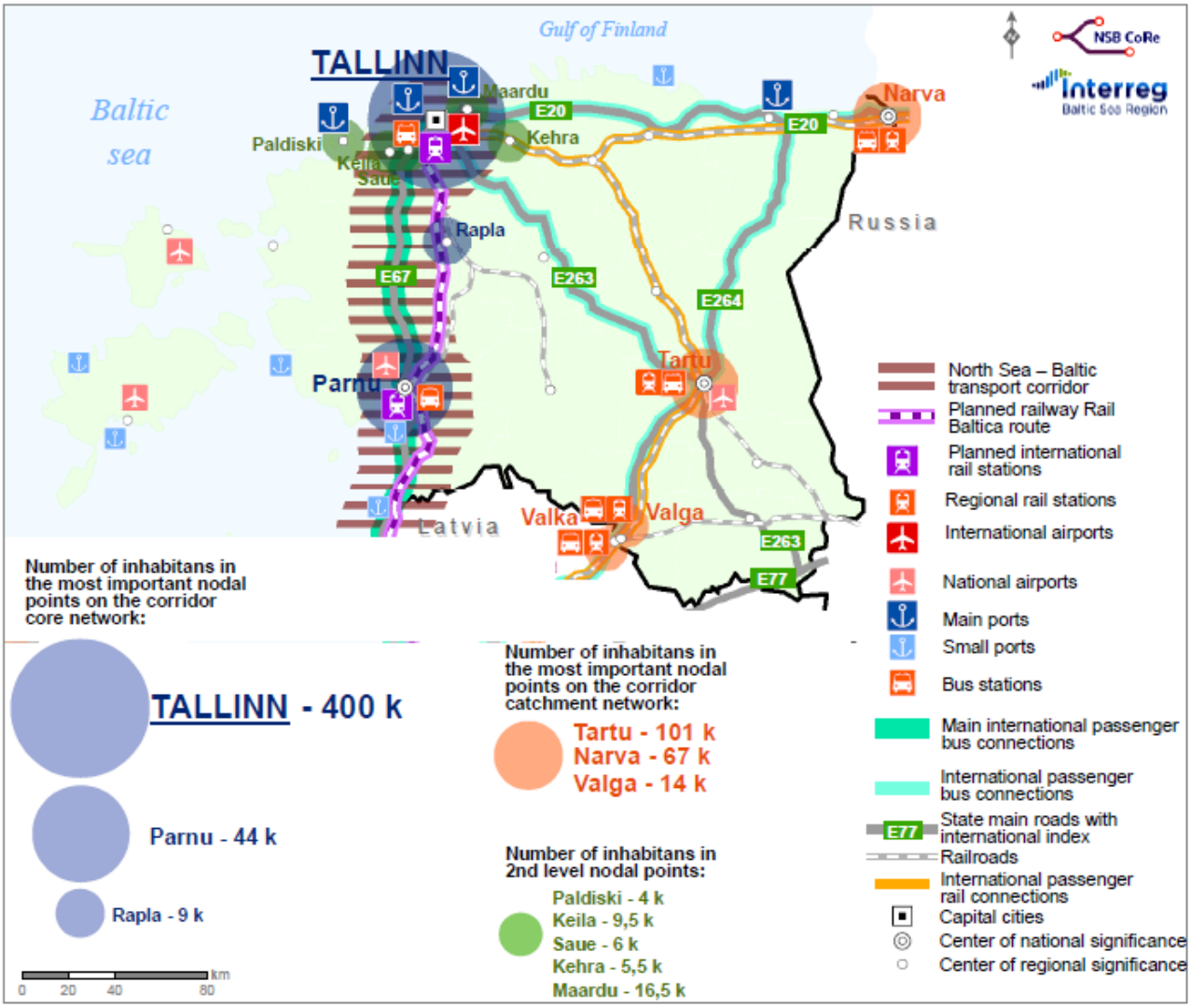


Figure 14. *Tallinn – Riga – Kaunas transport corridor development scenario (realistic) in Estonia.*

The Rail Baltica plan's assessment made in terms of rail traffic shows the potential of regional rail transport development in the Baltic countries with a maximum speed of 200 km / h. This means that the Rail Baltica route can be used not only for international passenger traffic, but also for regional and cross-border regional connections, providing fast and environmentally friendly transport solution for the entire Rail Baltica route.

For example, the plan identified sufficient potential for passenger traffic to create regional passenger traffic from Bauska to Riga and from Salacgriva to Riga in Latvia, from Parnu to Tallinn in Estonia and from Marijampole through Kaunas to Vilnius in Lithuania.

In addition, when developing the plan, a sufficient level of demand for cross-border regional transport was identified, for example, from Marijampole to Riga (Lithuania-Latvia) or from Tallinn to Riga Airport (Estonia-Latvia). It is important to note that the development of regional traffic along the Rail Baltica route will require additional research and decisions at the level of member states.

Regional stops along the Baltica route are defined in Estonia and Latvia. In Estonia in accordance with the counties' development plans regional stops are planned in Harju county at Assaku, Luige, Saku and Kurtna, in Rapla county at Kohila and Järvakand, in Pärnu county at Kaisma, Tootsi, Kilksama and Häädemeeste. In Latvia regional stops are expected at Salacgriva, Tujasmuiza, Skulte, Vangazi, Sauriesi, Acone, Janavarti (Akropolis), Riga (Central station)m, Tornakalns, Imanta, Riga Airport, Jaunmarupe, Jaunolaine, Kekava (*Riga Planning Region),* Iecava and Bauska (*Zemgale Planning Region*). Regional stops are not considered in Lithuania at the moment.

Regional stops are partly marked on the maps of Major nodal points level.

On the prepared cartographic materials for each country separately the most important existing and perspective nodal points for business travellers and commuters on the North Sea – Baltic corridor core network and 2nd level nodal points are also marked and presents the number of inhabitants in them. In Estonia as 2nd level nodes were defined cities Paldiski, Keila, Saue, Kehra and Maardu, in Latvia – Tukums, Jelgava, Ogre, Cesis and Sigulda, in Lithuania – Palanga, Rukla, Jonava, Kedainiai, Elektrenai, Lantvaris, Prienai and Garliava. Second level transport connections are also defind for each country.

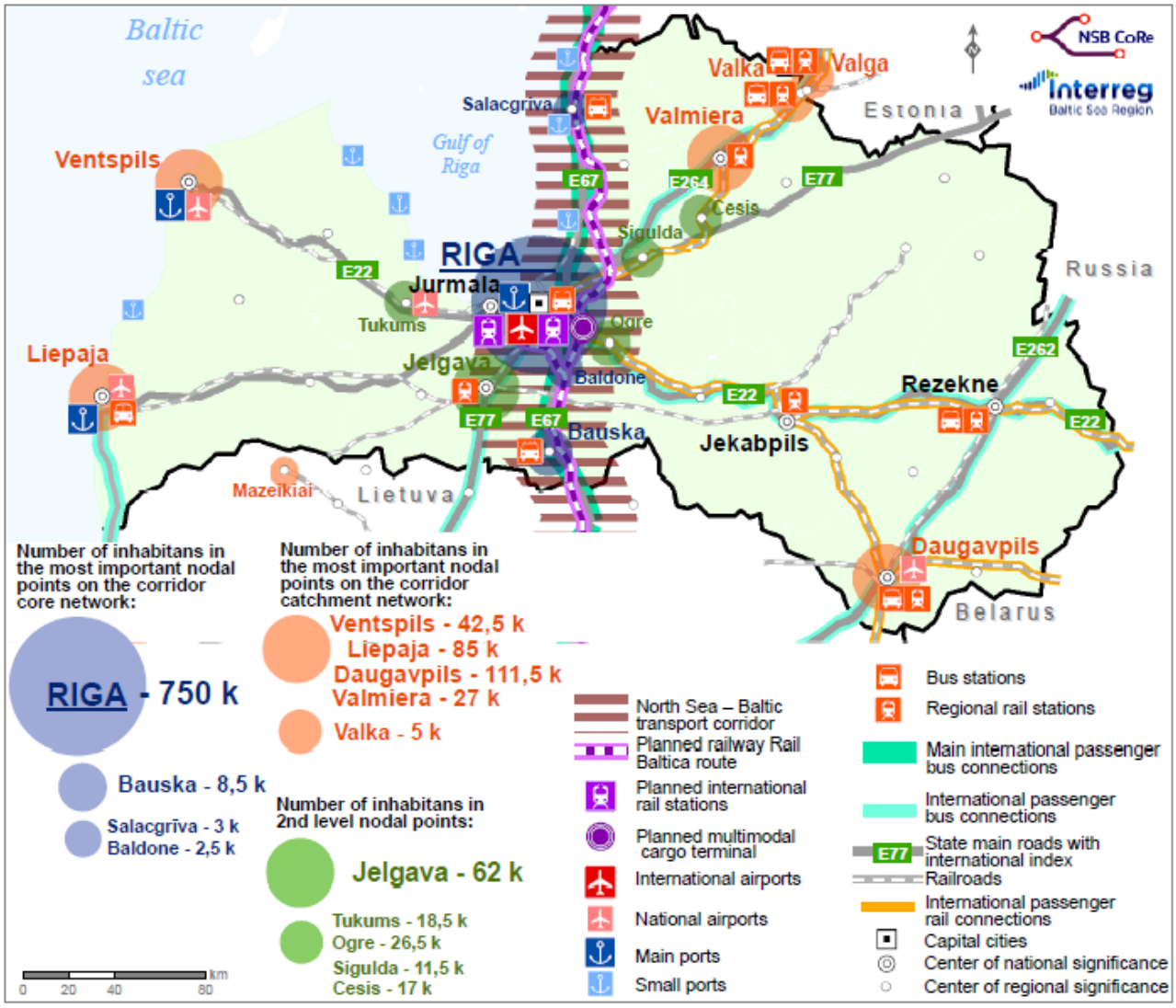


Figure 15 *Tallinn – Riga – Kaunas transport corridor development scenario (realistic) in Latvia.*

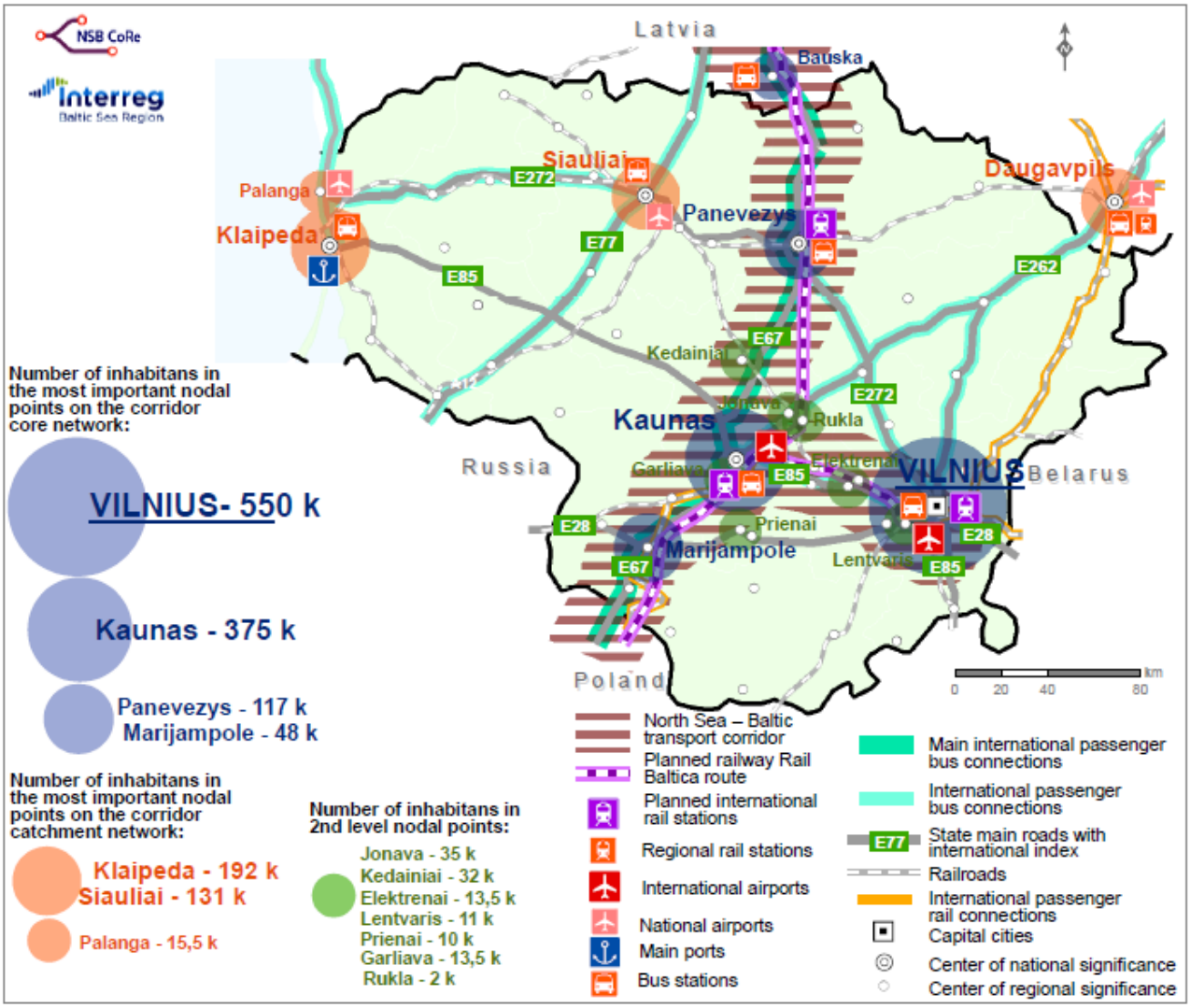


Figure 16. *Tallinn – Riga – Kaunas transport* corridor *development scenario (realistic) in Lithuania.*

MAJOR NODAL POINTS level

In the final part of the report, cartographic materials are presented reflecting the development of the Tallinn – Riga – Kaunas transport corridor near the *major nodal points: Tallinn* (Figure 17), *Riga* (Figure 18) *and Kaunas (with extension to Vilnius)* (Figure 19). In this case, the cartographic materials presented in the plans and sustainable strategies of cities development were considered as source materials, as well as project report on Riga Metropolitan area development. In the case of Kaunas, transport connections by individual cars are considered in more detail.

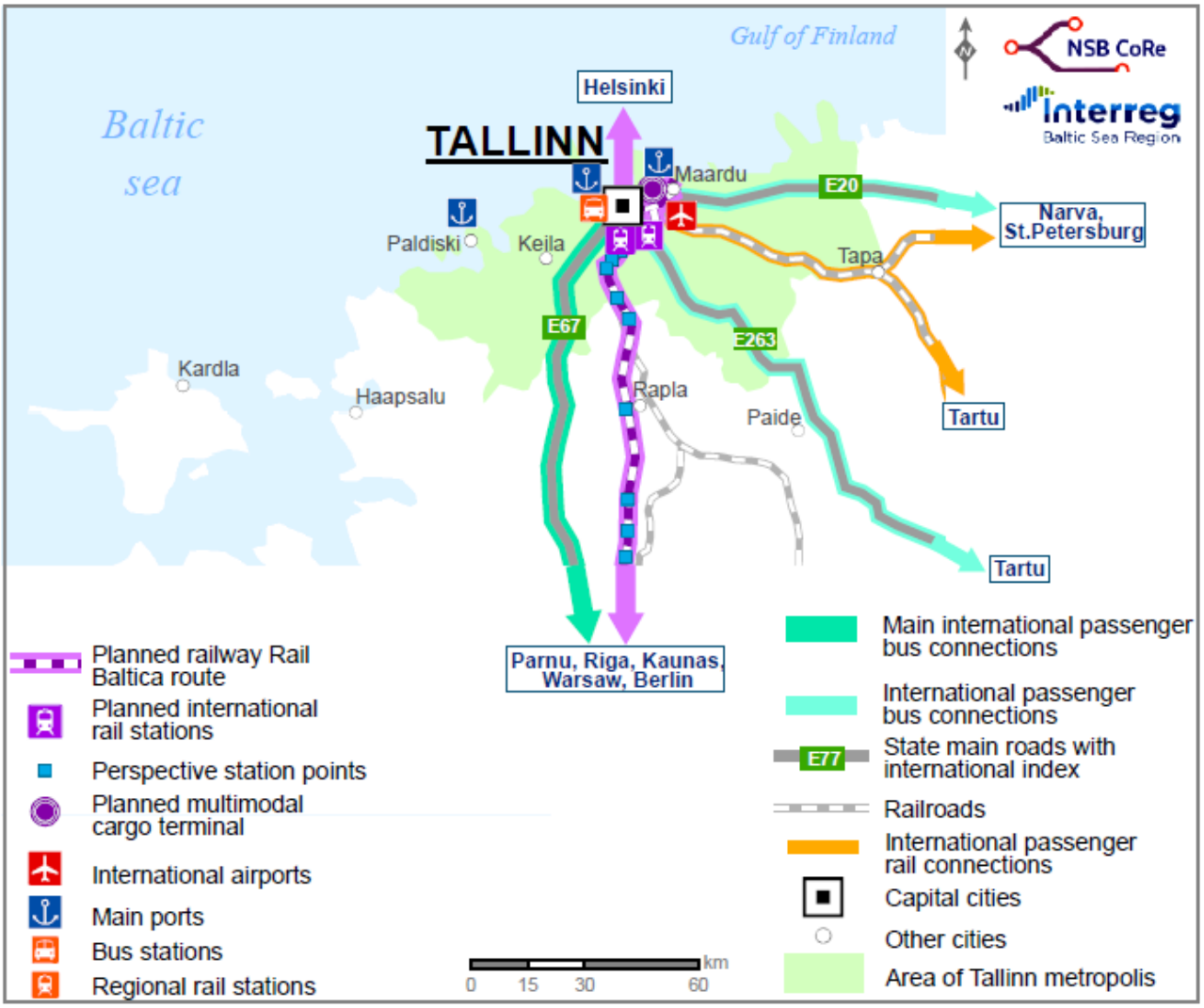


Figure 17. *Realistic development scenario of Tallinn surrounding area (Harju region).*

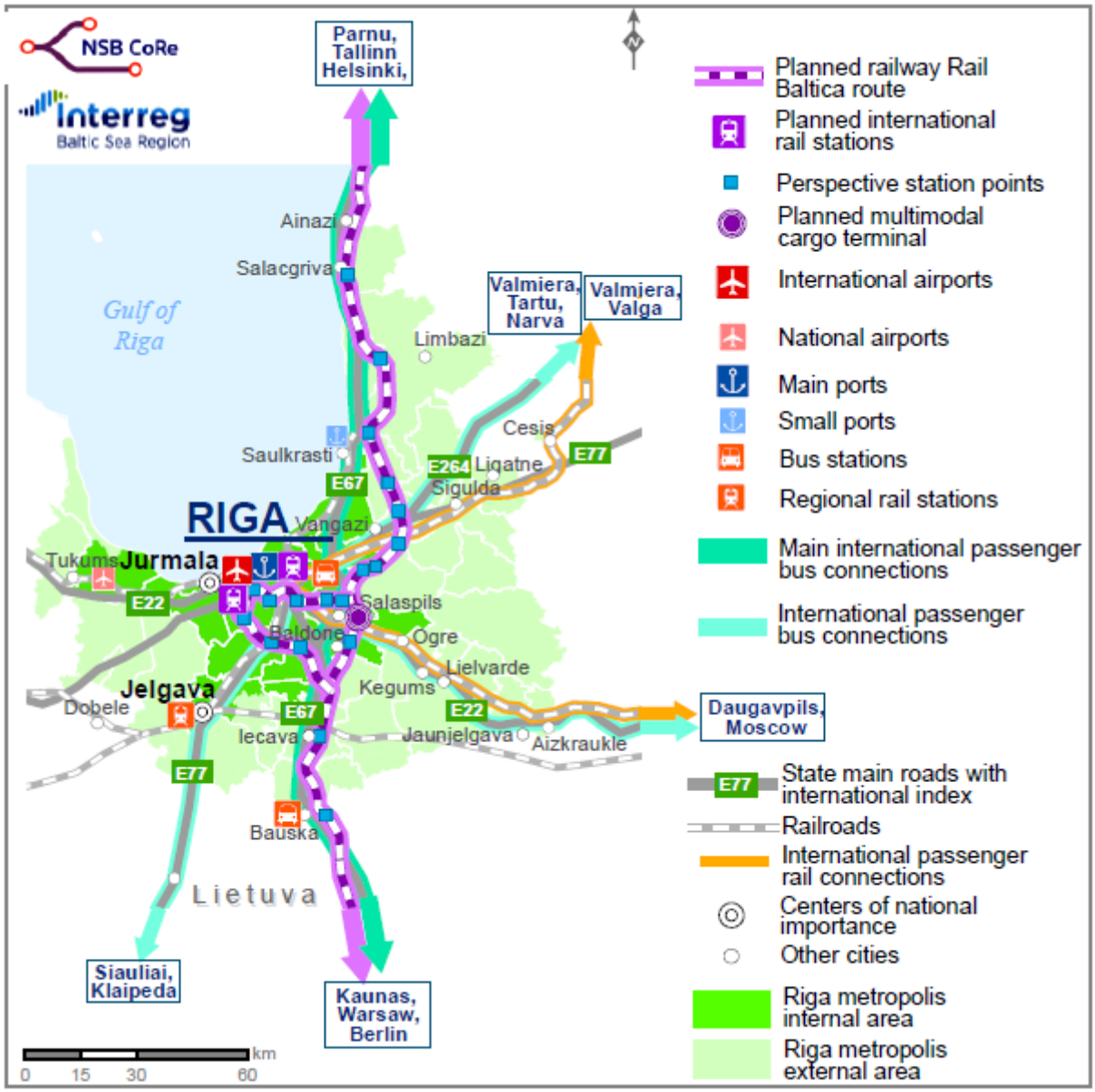


Figure 18. *Realistic development scenario of Riga surrounding area (Riga metropolitan area).*

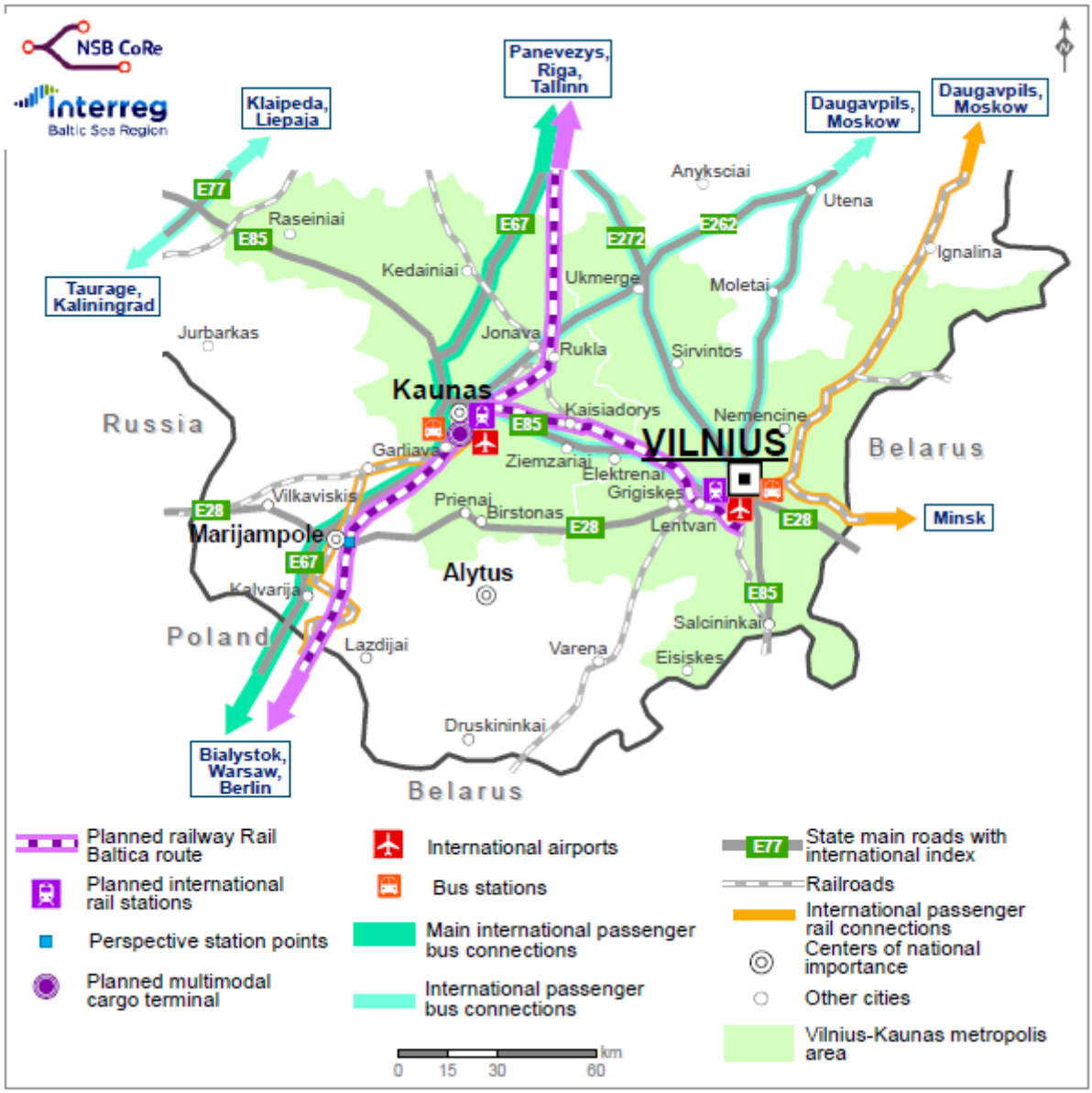


Figure 19. *Realistic development scenario of Kaunas and Vilnius surrounding area (regions).*

5. General Summary

This report was developed based on the project report *'Spatial structure and the transport system along Tallinn – Riga – Kaunas commuting growth corridor'*, as well as Rail Baltica materials and documents elaborated by the project partners (VASAB, City of Tallinn). In preparing the document, the Rail Baltica project's impact on the development of the transport system as a whole in the framework of the project NSB CoRe, as well as the opportunities of business travellers and commuters was also evaluated.

The report materials provide assessment of the value and advantages of the main transport modes along Tallinn – Riga – Kaunas commuting growth corridor with a focus on passenger transportation but taking into account also the transportation of cargo.

The cartographic material shows the stops of the Baltica route: Tallinn, Parnu, Riga, Riga Airport, Panevezys, Kaunas and Vilnius. In addition to the international connection, the Rail Baltica route is also planned to be used for regional trains.

In Estonia in accordance with the counties' development plans regional stops are planned in *Harju county* at Assaku, Luige, Saku and Kurtna, in *Rapla county* at Kohila and Järvakand, in *Pärnu county* at Kaisma, Tootsi, Kilksama and Häädemeeste In Latvia stops are expected at Salacgriva and Skulte (*Riga Planning Region),* as well as at Bauska (*Zemgale Planning Region*). Regional stops are not considered in Lithuania at the moment.

The paper also presents the most important existing and perspective nodal points and connections for business travellers and commuters on the North Sea – Baltic corridor's core and catchment areas, as well as 2nd level nodal points.

It should be noted that there is a difference in the categorization of the nodal points in the materials of the partners. In particular, in the partner's report *Analysis of carriage of passengers and the transport system between Tallinn and Riga* the the most important existing and perspective nodal points on corridor catchment areas in Estonia (Narva and Tartu) are defined as *'other important areas of influence'*.

The document provides a description of Tallinn – Riga – Kaunas transport corridor development scenarios for Estonia, Latvia and Lithuania together, each country separately and major nodal points. Visual cartographic materials are presented in accordance with this description.