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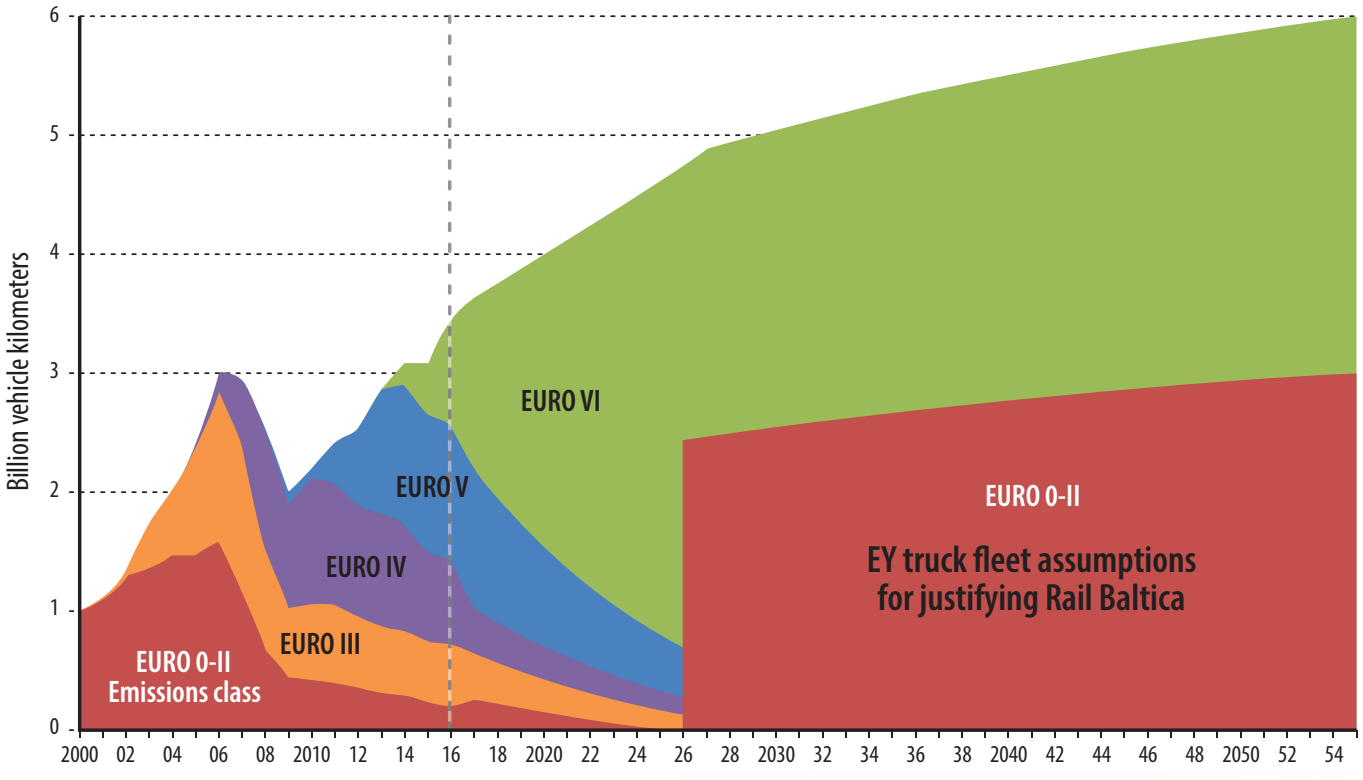

Major mistakes in Rail Baltica Cost-Benefit Analysis made by Ernst & Young Baltic

Includes replies from all parties and the European Commission

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MTÜ ARB

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Abstract

There are several fundamental mistakes in the Rail Baltica (RB) cost-benefit analysis prepared by Ernst & Young Baltic (EY). Our study does not assess the truthfulness of the freight and passenger volumes forecasts; instead, the main object of our study is the assumptions used in the CBA and the calculations of the socio-economic impact of RB.

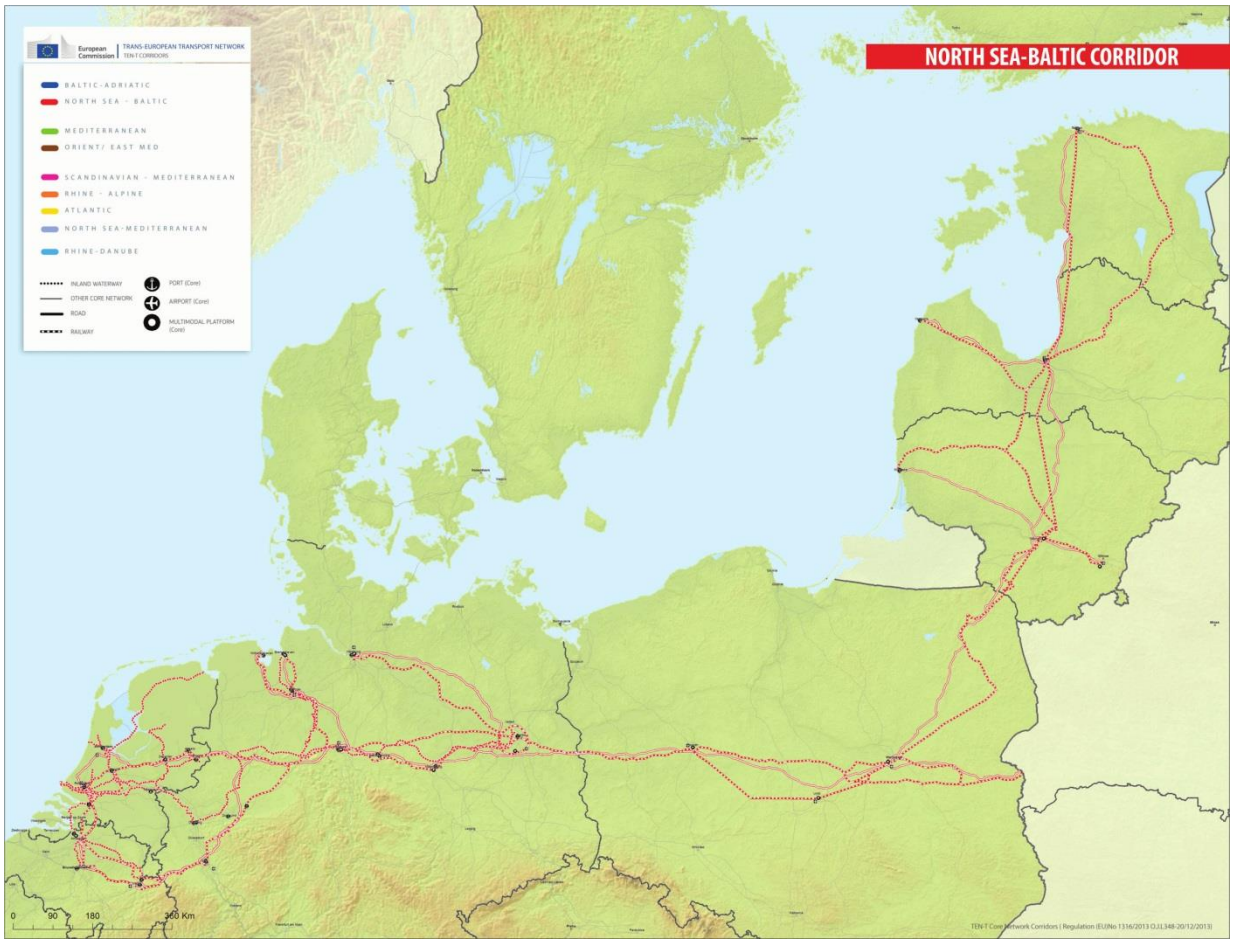
- EY has stated that the biggest benefit of RB will arise from liquidation of air pollution. In reality, the trucks do not generate the claimed volumes of air pollution in the Baltic States. Manipulation of emission standards and fuel consumption of trucks has artificially increased the socio-economic benefits of RB.
- In the CBA, EY does not cover the external costs of the environmental impacts arising during the period of railway construction, and also not the ongoing environmental burden of the railway during its operation which is a requirement of the CBA guide.
- Most of the road transport takes place without using any freight terminals; it is apparent from the response of RB Rail and EY that the replacement of such road transport with RB would not be feasible due to the costs of the last-mile delivery.
- EY has assumed that RB will compete with a small part of road transport where terminal handling is included but has not taken into account the additional transportation costs from the railway freight terminal to the main trucking terminal.
- The CBA Guide requires that “a complete set of data and sources of evidence (used in the CBA) should be made easily available”; however, none of the calculations and only a few of the sources referred to in the study have been made available despite frequent requests.

Even when considering only the mistakes from such assumptions that can be easily calculated, the total income of RB of €16 billion will be reduced by over €4 billion. It appears that the costs of RB will exceed the socio-economic benefits and therefore it will not be expedient but instead detrimental for the society. In addition, RB will not be eligible for EU co-financing, because the project is not viable.

Contents

Rail Baltica project introduction

Rail Baltica (RB) is a rail project linking four new EU Member States of the EU – Poland, Lithuania, Latvia, and Estonia – as well as Finland.[1] According to the study[2] conducted by COWI in 2007, it was planned as an upgrade to 160 km/h of the existing 1520 mm gauge railway and was to be financed by the EU under TEN-T priority project 27.[3] The length of the current track is approximately 1,200 km via the most direct existing route from Tallinn to Warsaw. According to the COWI study, the required investment cost within the borders of the Baltic States was 1 billion euros.

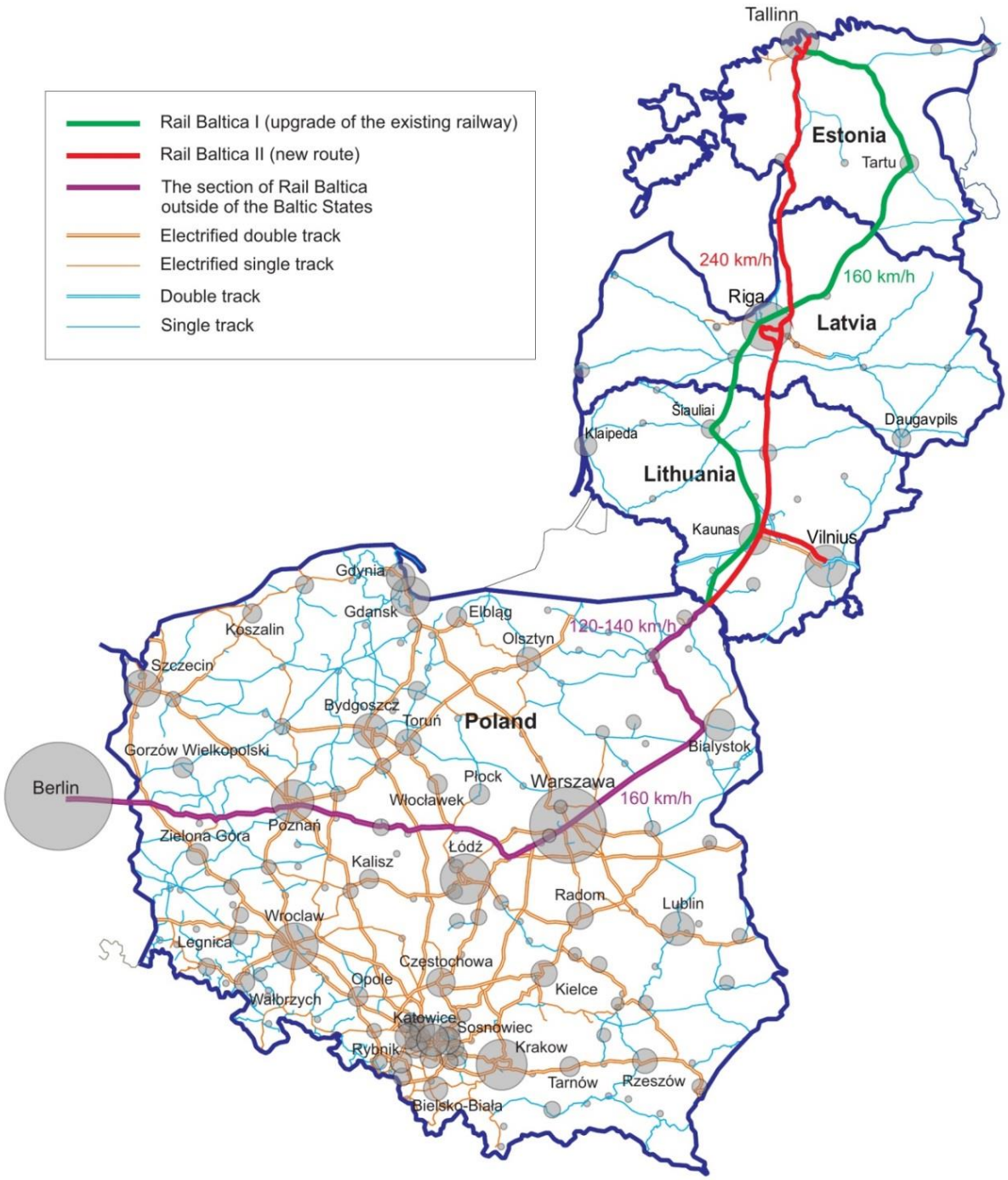


Map 1. TEN-T North Sea-Baltic Corridor Core Network Map
https://ec.europa.eu/transport/sites/transport/files/north_sea-baltic_map_1.pdf

In 2011, the governments of the Baltic States made a political decision to change the project to constructing a new double-track electrified 1435 mm gauge railway line and not to use the existing rail-

[1] *O. Koppel.* Some side notes about Rail Baltic. *Baltic Rim Economies.* No 1. February 2017.
https://www.utu.fi/en/units/tse/units/PEI/BRE/Documents/BRE_1_2017.pdf#page=50
[2] Feasibility Study on Rail Baltica Railways. Final Raport. January 2007.
European Commission Directorate-General Regional Policy. COWI.
http://ec.europa.eu/regional_policy/sources/docgener/evaluation/railbaltica/report.PDF
[3] Priority Project. Innovation and Networks Executive Agency.
https://ec.europa.eu/inea/ten-t/ten-t-projects/projects-by-priority-project/priority-project-27

way corridor.[4] The new 240 km/h route goes straight; this will make the length of the route from Tallinn to the Lithuanian-Polish border about 100 km shorter. Due to the different gauge, many new railway stations and a new branch to Vilnius were essential to add to the project. The section of the Rail Baltica project coordinated by RB Rail AS[5] and analysed by EY will end at the Lithuanian-Polish border and a remarkable difference between the speed standards in the Baltics (240 km/h) and Poland (120–160 km/h) will remain.



Map 2. Map of the railway network of the Rail Baltica area.[6,7]

[4] North-Sea-Baltic Corridor. Innovation and Networks Executive Agency. *https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/projects-by-country/multi-country/2014-eu-tmc-0560-m*

[5] The joint venture of the Baltic States for developing the Rail Baltica project. *http://www.railbaltica.org*

The Cost-Benefit Analysis (CBA) completed by Ernst & Young Baltic (EY) in 2017 should include all the essential costs and benefits of the part of the Rail Baltica project that is in the territory of the three Baltic States. According to the study, the investment costs of the section in the Baltic States are 5.8 billion euros.

In Estonia, the public has criticized the political decision of changing the original project to the new route. In 2016 and 2017, three public letters[8,9,10] were composed by public persons including scientists, academics, and architects who called on the government to stop the project in its planned new form. The main arguments in the letters were that the new track will cause too much damage to the nature and does not essentially improve the travelling possibilities.

On 8 June 2017, Priit Humal, Karli Lambot, Illimar Paul and Raul Vibo, experts on logistics and engineering, published a critical analysis[11] of the EY CBA where they claimed that €4.1 billion of the stated socio-economic benefits are faulty and therefore the Rail Baltica project is neither feasible nor eligible for the EU. They asked the comments of RB Rail AS, the Rail Baltica holding company, but RB Rail AS refused to provide a written response for three months.[12] It was not until a letter to Baiba Rubesa, the manager of RB Rail AS, was published in the media that RB Rail AS felt the need to respond[13].

[6] At the end of 2017, Poland initiated a study to consider increasing the previously planned speed on the railway between Ełk and Białystok to 160–250 kmph. *http://www.suwalki24.pl/article/1,rail-baltica---najtrudniejszy-odcinek-jest-umowa-na-studium-wykonalnosci-elk---suwalki---trakiszki*

[7] In the railway section between Białystok and Warsaw, preparations have been made to increase the speed to 200 kmph. *http://www.poranny.pl/wiadomosci/bialystok/art/5375590,rail-baltica-warszawabialystok-trasa-ma-byc-gotowa-w-2018,id,t.html*

[8] Avaliku elu tegelaste pöördumine: Eesti rahva ja maa tuleviku nimel tuleb peatada Rail Balticu rajamine kavandatud kujul. Postimees: Arvamus. 29 September 2016. *https://arvamus.postimees.ee/3854903/avaliku-elu-tegelaste-poordumine-eesti-rahva-ja-maa-tuleviku-nimel-tuleb-peatada-rail-balticu-rajamine-kavandatud-kujul*

[9] Avaliku elu tegelaste pöördumine: Eesti vajab raudteed Euroopasse, kuid mitte praegu planeeritud kujul. *Postimees: Arvamus.* 25 January 2017. *https://arvamus.postimees.ee/3991809/avaliku-elu-tegelaste-poordumine-eesti-vajab-raudteed-euroopasse-kuid-mitte-praegu-planeeritud-kujul*

[10] 222 kodaniku kiri Rail Balticu kohta. *Postimees: Arvamus.* 12 June 2017. *https://arvamus.postimees.ee/4143855/222-kodaniku-kiri-rail-balticu-kohta*

[11] Appendix 3. *http://avalikultrailbalticust.ee/PDF/RB%20EY%20errors.pdf*

[12] RB Rail not to allow recording detailed Rail Baltic meetings. *The Baltic Times*. 18 September 2017. *https://www.baltictimes.com/rb_rail_not_to_allow_recording_detailed_rail_baltic_meetings/*

[13] Appendix 5

Summary

The goal of our study is to scrutinize selected aspects of the Rail Baltica (RB) Cost-Benefit Analysis[14] (EY report) prepared by Ernst & Young Baltic (EY). We have not assessed the truthfulness of the freight and passenger volumes estimated in the CBA. The main object of our analysis is the assumptions used in the CBA and the calculations of the socio-economic impact of RB.

For EU infrastructure projects to be feasible, the discounted revenue, including the socio-economic benefits and the anticipated cash flow, must exceed the discounted investment costs, the running costs, and the environmental impact costs of the project. EY found in the EY report that the Rail Baltica project would generate discounted costs of €4.5 billion and discounted revenue of €5.4 billion. On 8 June 2017,[15] MTÜ ARB (NGO Openly about Rail Baltic) challenged €1.2 billion of the discounted revenues and claimed that the real NPV would be negative (Fig 1). The greatest expected socio-economic benefit (40%) of the project is "cleaner air" that is supposed to come from the modal shift of goods transport from road to rail. The trucks on roads are of different emission classes. **On 8 June 2017, ARB pointed out that in its calculations, EY has used the emission costs of EURO I and II class vehicles that were produced in the last century. In reality, new vehicles whose emission class is EURO II or below are prohibited to be sold in the EU since 1 October 2000.**[16] Trucks currently in production must comply with the requirements of emission regulation EURO VI, which means that they cause substantially less pollution and their emission cost level is 25 times lower. About 6.3% of the annual road freight transport vehicle kilometres in the Baltic States are currently driven by vehicles older than 15 years, i.e. vehicles that may be meeting the EURO II or lower emission standards[17]. Due to the mismatch between reality and assumptions in the EY report, the socio-economic benefit from air pollution is exaggerated by €3 billion (Fig 2).

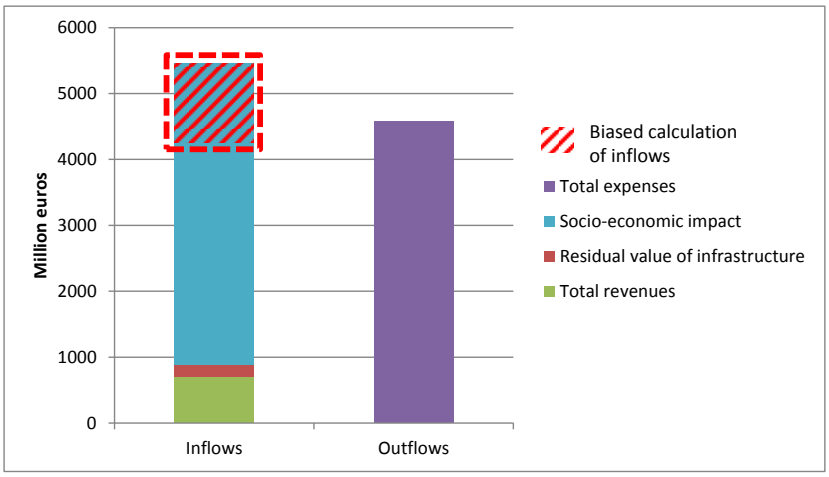


Figure 1. Socio-economic cash flows of RB (discounted).

Another €1.1 billion mistake was noted in the fuel excise tax reduction calculation. The reduction of the Baltic States budget revenues on the fuel excise tax due to the reduction of road traffic because of railroad transport has been considered in the EY report as a negative socio-economic benefit, but it has been understated (Fig 2).

[14] Rail Baltica Global Project Cost-Benefit Analysis. Final Report. EY. 30 April 2017. *http://railbaltica.org/wp-content/uploads/2017/04/RB_CBA_FINAL_REPORT_0405.pdf*

[15] Appendix 3

[16] Directive 1999/96/EC of the European Parliament and of the Council of 13 December 1999. *http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A31999L0096*

[17] Eurostat: Annual road freight transport, by age of vehicle (Mio Tkm, Mio Veh-km, 1 000 Jrnys). *http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=road_go_ta_agev&lang=en*

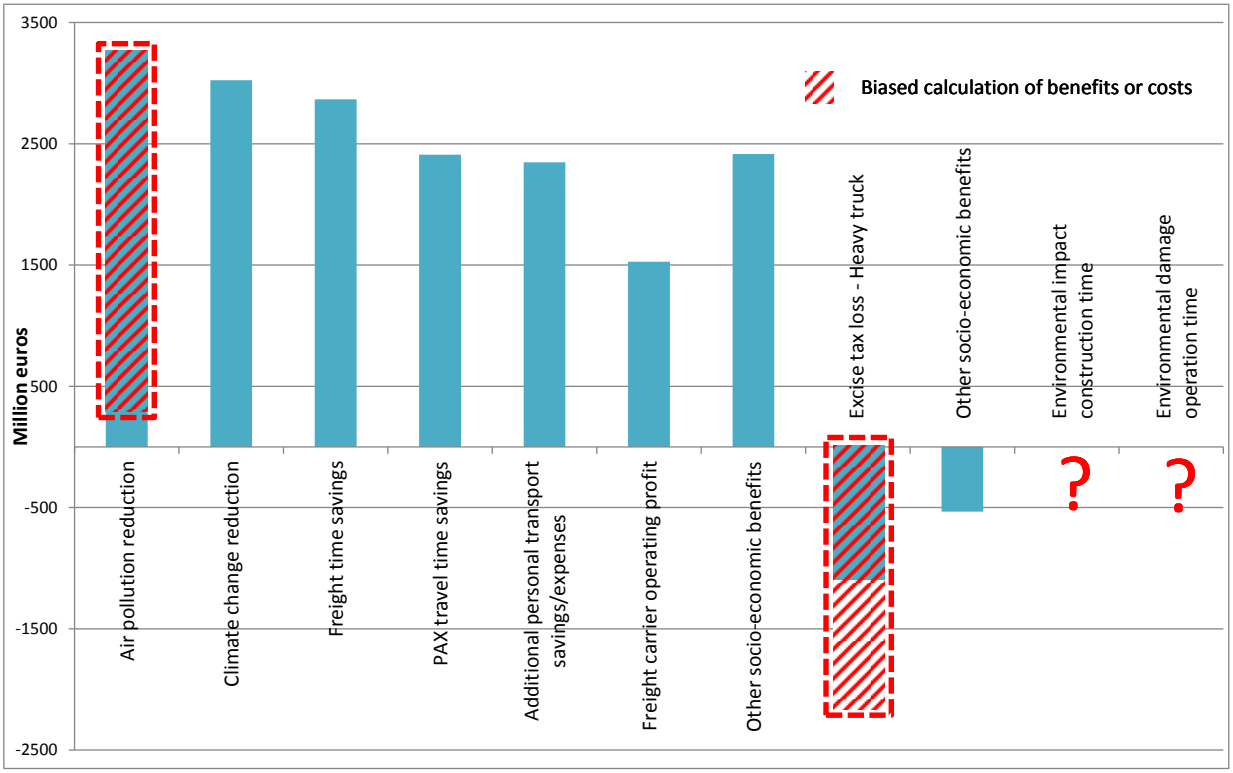


Figure 2. Socio-economic impact of RB (benefits and costs, undiscounted), biased and ignored calculation pointed by ARB

In addition to the abovementioned major issues, several others are highlighted in this document *https://goo.gl/bcZCVx*. On 8 June 2017, when ARB disclosed the mistakes to the public, RB Rail sent out a press release where it stated that the EURO II class parameters had not been used in the cost-benefit analysis and that the cost-benefit analysis had been approved by experts from DG Move and DG Regio, whose evaluation also helped to bring the final analysis into conformity with the highest standards of the CBA Guide.[18] ARB sent questions no 1–4 and 6–8 on 9 June 2017. Questions 5 and 9–13 were sent on 25 September 2017 to RB Rail[19]. ARB has sent requests for publication of sources and calculations several time to the beneficiaries (the ministries of the Baltic States), RB Rail AS and Ernst & Young Baltic AS.

ARB received the first reply on 25 September 2017.[20] The reply of EY and RB Rail AS was written in unofficial style. The document composed over a three-month period has no formal letterhead nor dates or names of the signatories. The document seems to be unfinished as the last answer seems to end in the middle of the sentence. Also, answers have not been provided to all our questions. Further answers were provided on 13 October 2017.[21]

The answer of RB Rail and EY notes, somewhat incomprehensibly, that for the incremental approach, it is necessary to choose the scenario without-the-project that reflects only the changes that are fully certain. According to the CBA Guide, in case of uncertainty the most likely and realistic scenario should

[18] Appendix 4
[19] Pages 13–20
[20] Appendix 5
[21] Appendix 6

be selected, and risk assessment with sensitivity analysis should be performed in case of deviation from the most likely scenario[22]. In contrast to the CBA Guide, EY tries to justify the usage of the constant "frozen" world around the project in case of uncertainty about the future, and calls it a "cautious and conservative approach". The biggest mistake in this approach concerns the competing road transport, by assuming that the current older-than-average vehicles will be the same and even worse in the coming 40 years. This obviously ignores the fact that even with a possible slight increase of the average age of the vehicles, a vast majority of the trucks running on highways side by side with Rail Baltica will have a production year of well above 2020. Equalising the emissions from these trucks with the ones that were produced in the previous century is far from the realistic scenario. If an investor is conservative, he/she expects the investment and running costs as well as competition to be higher, and the income to be lower. The answer of EY defies simple logic and misinterprets the CBA Guide.

EY has provided no detailed projections or calculations. We have prepared the projection of the fleet mixture and an alternative projection, taking into account the assumptions suggested by EY. All of them show that in the counterfactual scenario, more than 90% of the vehicles will be at least of EURO VI emission class, and less than 1% of the vehicles will be of EURO II or below emission class[23]. It follows that EURO II class emission level cost of 0.10 EUR/vkm cannot be used in the Rail Baltica CBA. We would like to point out that for the new trucks allowed to be sold in the EU from 2014 (only EURO VI trucks), the emission level cost is 25 times lower in motorways, e.g. 0.004 EUR/vkm.

Despite the opposite claims provided in the answer, the CBA report prepared by EY ignores the environmental costs arising from the implementation and operation of the project, such as environmental impact costs arising during construction and from CO2 emissions, reduced CO2 absorption, unsealing of nature, restoration costs of landscape, barrier effects to society, etc. Altogether, these ignored costs can be estimated at no less than 500 million euros, and they probably far exceed 1 billion euros. Taking these costs into account, as required by the CBA Guide[24], will reduce the feasibility of the project even further (Fig 2). The environmental costs of natural losses should be accounted for in all projects since it also helps to justify the use of existing corridors in comparison of alternatives and thus avoid excessive use of land and natural resources. It goes without saying that this would also lead to savings in investment and better feasibility.

Vaste majority of the road transport takes place as FTL (Full Truckload) or LTL (Less than Truckload) shipping as a door-to-door service without using any freight terminals, and it is apparent from the response of RB Rail and EY that the replacement of such road transport with rail transport would not be feasible due to the costs of the last-mile delivery. At least, the EY report does nothing to prove the opposite, and in their answer to our questions, RB Rail and EY have relied on such assumption to show that RB is competitive. The remaining road transport (groupage and a smaller share of LTL freight) has been compared to rail transport from railway freight terminal to another railway freight terminal in the EY report, without taking account the additional transportation costs from the railway freight terminal to the main trucking terminal. As further delivery (or the last-mile delivery) may only begin at the main trucking terminal, the failure to take into account the costs of transport from the railway freight terminal to the main trucking terminal and other costs means that cargo transport us-

[22] Guide to Cost-Benefit Analysis of Investment Projects. Economic appraisal tool for Cohesion Policy 2014–2020. December 2014, p. 67-74. *http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/cba_guide.pdf*
[23] Appendix 1
[24] Guide to Cost-Benefit Analysis of Investment Projects. Economic appraisal tool for Cohesion Policy 2014–2020. December 2014, p. 38-40. *http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/cba_guide.pdf*

ing RB will actually be more expensive and less competitive, and its socio-economic benefit will be significantly smaller compared to the EY report.

RB Rail AS and EY have failed to give reasonable answers to any of the issues raised by ARB. We maintain that the EY report contains unjustified benefits in the value of at least €4.1 billion, and their correction would cause a negative NPV, which means that the Rail Baltica project is ineligible for the CEF funding[25] and would not generate enough benefits for the society.

It is odd that cleaner air is mentioned as a most significant positive socioeconomic impact; after all, the corridors of RB and its parallel highway (Via Baltica) are located in sparsely populated areas, e.g. in West Estonia where the population density is approx. 10 per sq km. An expected positive impact would be better quality and higher speed of passenger transport, both domestic and international, but this would require RB to be integrated with the existing transport network which is located optimally in regard to population but is currently more or less deteriorated. Unfortunately, this is not the case; RB will not be connected to the existing network either in terms of location or in terms of technology, which means that the socio-economic impact in regard to improvement of passenger transport will be extremely limited, especially in Estonia.

The CBA Guide requires that "a complete set of data and sources of evidence (used in the CBA) should be made easily available"[26]; however, none of the calculations and only a few of the sources referred to in the study have been made available despite frequent requests.

ARB has sent analysis of the issues[27] to DG Move who is responsible for funding the project. ARB has received two replies. The Director of Directorate B of the DG Move, Herald Ruijters, assured in his letter of 17 October 2017[28] that DG MOVE has no reason to doubt the methodological soundness of the analysis that has been conducted fully in line with the guidelines of the Commission. The Director of the Innovation and Networks Executive Agency, Dirk Beckers, explained in his letter of 19 October 2017[29] that it's not the INEA's role to discuss and verify technical issues of the CBA on the level discussed in the ARB analysis.

[25] Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013, Art 7. *http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2013.348.01.0001.01.ENG*

[26] Guide to Cost-Benefit Analysis of Investment Projects. Economic appraisal tool for Cohesion Policy 2014–2020. December 2014, p. 18. *http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/cba_guide.pdf*

[27] Appendix 1

[28] Appendix 7

[29] Appendix 8

Comments response sheet for Rail Baltica global project CBA prepared by EY

Questions from MTÜ ARB:

1. What kind of heavy truck type and why this is chosen in the assumptions "Heavy Truck Fuel % of OPEX 25%"?

Transferring of freight from trucks to rail will reduce the budgetary income of the Baltic States. This has been calculated by EY. In this calculation, EY used the share of fuel in the OPEX of an average truck operator. We found out that this figure (25%) was incorrectly carried over from the referenced source to the assumptions of EY. We claim that the source referenced by EY shows that the share of fuel is 30% for the vehicle types that RB could potentially replace.

Response from RB Rail AS and EY	Question resolved?	Comment by MTÜ ARB and request for clarification
a) The source referred to in the Rail Baltica Global Project CBA Final report (hereinafter – EY report) page 147 refers to the data that were used as a proxy (the range between 25-30%) that was substantiated during discussions with local industry (as indicated in the section 13.4. of EY report, more than 40 stakeholders have been interviewed) to arrive at relevant benchmark rate for the calculations, considering the local conditions. b) MTU ARB does not provide a justifiable source regarding the need to change the assumptions of the EY report, merely indicating that 24 cents/km is the value which "corresponds to the actual situation today" (no reference provided).	No	a) The content of the interviews has not been published and therefore cannot be considered as a verifiable[30] reference. Among the 40 interviewees, there are only a few stakeholders who offer road transport services. EY should provide a memo of these interviews to be used as a reference. In addition, Mr Karli Lambot, one of the authors of this study, can confirm that he was among the 40 interviewees and that with him, this topic was not discussed at all. Even though his company ACE Logistics is not a trucking company, as a freight forwarder he knows much about the business in various transport markets, e.g. in the road transport market. b) We admit that we did not submit a valid reference to the claim "corresponds to the actual situation today"; this is provided on page 21.

2. Why in the assumptions is used lower excise tax than actual today in Estonia and why this excise tax is not magnified by GDP growth as it is in the calculations of air pollution external costs.

The excise tax is by nature closely related to the external environmental cost of the fossil fuel usage. Although accurate predictions cannot be made, it is an unlikely and biased assumption that the excise tax rate will be constant until 2055, in contrast to the environmental costs that will increase according to the rise of the GDP forecast. This kind of fiscal policy would encourage using more energy and fossil fuels. We suggest that the counterfactual scenario should include an excise tax growth in correlation with other externalities considered in CBA.

[30] Guide to Cost-Benefit Analysis of Investment Projects. Economic appraisal tool for Cohesion Policy 2014–2020. December 2014, p. 18. *http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/cba_guide.pdf*

a) Regarding the tax rate: the excise tax rate was chosen in adherence to the general methodology of the Global Project CBA, using a united source (Eurostat) for the date of the reference year for the analysis. b) Regarding excise tax growth: RB Rail fully supports the position proposed by MTU ARB: "How much exactly excise and fuel prices are going to be in the future, or what kind of fuel is going to be used, nobody knows.", which supports the approach by EY of keeping the variables unchanged in the forecasting period to the extent possible due to the uncertainty in the future. However, RBR cannot find a detailed justification for the assumption suggested by MTU ARB: "It makes sense to assume that excise duty will rise at the same pace as the predicted increase in climate change effects." The analysis is done on real terms (page 143 of EY report), and all tax rates used in the analysis have been kept constant in real terms.	No	Not increasing the fuel excise tax in accordance with the GDP growth reduces the amount of fuel excise tax during 2026–2055 in comparison with other truck transport cost components. This would conflict with the major trends[31] highlighted in another EY study "Worldwide trends in excise duties: green, grey, coffee or sugar?"[32] The CBA Guide provides no rule requiring that if uncertainty exists, the current parameters should be applied. On the contrary, the most likely scenario should be used and risk analysis should be performed. EY has provided no justification for regarding the "keep constant" scenario as the most likely one, and has not performed a risk analysis for scenarios with different future excise tax rates.

3. What kind of heavy truck type and why this is used in the assumptions for the air pollution external costs for truck in the motorway 0.1 EUR/vkm and in the city 0.22 EUR/vkm?

The counterfactual scenario is selected on the basis of the evidence about the most feasible – and likely – situation avoiding, to the extent possible, any bias regarding the results by making assumptions about the expected changes in calculation parameters. ARB has referenced emission figures that do not correspond to the RB region. EY has used the following assumptions when estimating the future fleet: • 1/3 of the potential freight will be coming from Russia. According to the existing composition of the vehicles, 20% of vehicle kilometres are driven by vehicles older than ten years or more in the Baltic States;	No	Although the EY report (CBA) does include a long description of the counterfactual scenario (even though it is named as the "do-nothing option" in the CBA[33]), it only contains an extensive description of magazines, bottled water, spare parts, and bars. Contrary to the approach provided in the comment of EY and RB Rail AS[34], there is nothing about the composition of the truck fleet that contributes over half of the calculated incremental socio-economic benefits through various aspects. ARB admits that the EU average figures were used instead of specific numbers corresponding to the RB region. However, external costs arising specifically from the emissions in the Baltic States are even further away from the figures

[31] *M. Dalle, J.-D. Vasseur.* Worldwide trends in excise duties: green, grey, coffee and sugar? *http://www.ey.com/gl/en/services/tax/vat--gst-and-other-sales-taxes/ey-worldwide-trends-in-excise-duties*

[32] Future Financing of the EU. Final report recommendations of the High Level Group on Own Resources December 2016, p. 45. *http://ec.europa.eu/budget/mff/hlgor/library/reports-communication/hlgor-report_20170104.pdf*

[33] EY report, Section 7.1 (pp. 100-101) and Section 13.1 (pp. 227–289). *http://railbaltica.org/wp-content/uploads/2017/04/RB_CBA_FINAL_REPORT_0405.pdf*

[34] Appendix 5 and 6

• RB will be more likely to outcompete the old trucks with a lower emission class and less likely the EURO V/VI fleet;

• the market reacts adversely to introduction of new emission standards and the average age of trucks will increase due to new regulations

The ARB methodology fails to consider investments into road infrastructure and lorry fleet in the counterfactual scenario and innovation on the rail. (The abbreviation above has been made by ARB. The full answer is provided in the appendix.)

To summarize, with respect to the primary claim made by MTU ARB that the CBA overestimates the rate of air pollution of lorries, calculated by EY by combining the relevant rates for all emission classes to reflect the mixed nature of the current fleet of lorries in the Baltic states, it is important to emphasize that – given the inherent complexity and uncertainty regarding the possible future development in transport decarbonization – in this and other similar contexts it is often impossible to make objective assumptions about the future behavior of emission parameters. With this in mind, the EU CBA Guide prescribes a cautious and conservative approach, whereby a neutral reference scenario must be chosen, reflecting the information that is known at the time of forecasting and abstaining from potentially biased assumptions about the uncertain future. The approach suggested by MTU ARB, on the other hand, departs from this principle of neutrality by not only suggesting highly ambitious emission standards for future lorries (which, theoretically, may as well materialize in the future, but there is no way of objectively judging today with any degree of certainty), but also, perhaps deliberately, failing to acknowledge the potential effects of further decarbonization and environmental innovation, for example, in the fields of rail traction and power supply. It is with this seemingly biased and methodologically unscrupulous approach that MTU ARB comes up with the sensationalist conclusion that the CBA emission benefits are overstated by around 3 billion euros.

used by EY[35,36].

According to EUROSTAT, less than 6% of the vehicle-kilometres in the Baltic States are currently driven by vehicles manufactured in the previous century and being of emission class of EURO II or lower[37]. It's illogical to believe that this small amount of old vehicles will still be in service in 2026 and, without the RB project, would remain on the roads until 2055.

ARB has not created any new counterfactual scenarios that have the deficiencies claimed by RB Rail AS and EY. The EY report states on page 100 that RB has no effect on the Via Baltica development. Any and all costs mentioned in the comments should be a part of the scenario described in the EY report.

No reasonable claims have been provided to challenge the issues described in the ARB analysis.

A detailed discussion and references are stated on pages 21–25.

[35] Ricardo-AEA: Update of the Handbook on External Costs of Transport. January 2014. Appendix H. *https://ec.europa.eu/transport/sites/transport/files/handbook_on_external_costs_of_transport_2014_0.pdf*
[36] Appendix 1
[37] Eurostat: Annual road freight transport, by age of vehicle (Mio Tkm, Mio Veh-km, 1 000 Jrnys). *http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=road_go_ta_agev&lang=en*

4. What kind of proportions are used in the calculations for external costs for a heavy truck between city and motorway?

Regarding air pollution assumptions, the EY report (on page 146) provides two figures for heavy trucks "Within city" 0.22 EUR/vkm and "Outside city" 0.10 EUR/vkm. No explanation is provided about the proportion of these figures in pollution calculations.

a) The analysis has considered HEATCO indications. See also answer to previous question No 3.	No	The answer seems to be incomplete. No specific reference is made nor justifications given of how are any suggested HEATCO average proportions applicable in the particular case where the counterfactual scenario contains long-haul vehicle rides to the customer's warehouse. The project scenario should include terminal-to-customer legs. The reference to the answer to previous question No 3 is ambiguous. This topic is not covered there.

5. The CBA does not consider railway construction time environmental costs, permanent environmental costs, neither electricity production emissions that are required to run the electric locomotives. Please explain how this is in line with the EU CBA guidelines?

The environmental costs arising from the implementation and operation of the project, such as environmental impact costs arising during construction and from CO2 emissions, reduced CO2 absorption, unsealing of nature, restoration costs of the landscape, barrier effects to society, etc. Altogether, these ignored costs can be estimated at no less than 500 million euros, and they probably far exceed 1 billion euros. One of these components: the cost factor for unsealing costs (to repair and compensate the damages of transport infrastructure to nature and landscape, the area of transport infrastructure has to be unsealed) is € 27.2 per m2 for Germany based on the last UIC study (INFRAS/IWW, 2004) and updated to 2008 by using the price development between 2004 and 2008 (consumer price index). The German cost factor is transferred to other countries by using the GDP per capita (PPP adjusted).

In line with CBA methodology, final construction costs and operating costs have been converted into economic CAPEX and OPEX values that consider such factors, e.g., fuel used in construction has excise tax element that represents the negative environmental externalities. Assumption that railway construction and electricity production have consequences involving financial cost is correct. Same time you have to keep in mind that during the rise of traffic intensity on the roads you have to consider also investments to road infrastructure. Alternative to Rail Baltica would be investments to Via Baltica, enlarging road to 4 lines highway, that also brings additional similar construction and environmental costs. Such expenses will not happen only when status quo is kept and investments to road	No	The question has not been answered. As it stands, the EY report fails to account for the requirements in the CBA Guide[38], and all the environmental costs of the new railway corridor are missing from the calculations. We requested a copy of the detailed calculation of the CAPEX, but neither RB Rail nor EY has provided it yet. The CAPEX provided in the EY report (Table 49 on page 145 of the EY report) does not include the environmental impact costs. The same applies to the OPEX calculation (Table 56 on page 153 of the EY report). The claim in the comment that the scenario without the RB project requires additional development cost and assessment of the envi-

[38] Guide to Cost-Benefit Analysis of Investment Projects. Economic appraisal tool for Cohesion Policy 2014–2020. December 2014, p. 38-40. *http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/cba_guide.pdf*

infrastructure will be avoided. In reality the fact that transport of goods through Via Baltica (look details at Estonian Road Administration web page www.mnt.ee) is growing, there is no reason to assume that investments to road construction is avoidable. Taking account that environmentally more friendly railway transport development has priority in Estonia as well in Baltics and EU as a whole it is hard to believe that road transport development will get advantage in front of better alternatives.

ronmental impact of the Via Baltica road conflicts with the EY report (page 100) stating that the implementation or non-implementation of the RB has no impact on road development plans. In case EY now wants to review this position, this essential part should be corrected in the CBA regardless of any statements discussed in the current document.

6. Have you submitted CBA to DG Move or DG Regio?

The final report was thoroughly presented not only to all key Baltic and European institutional stakeholders, but also made available – in its entirety – and presented to the general public, in line with RB Rail's wider philosophy of promoting transparency and openness to public scrutiny in the project implementation. Additional public seminars were held in Tallinn and Tartu to closely engage with both project supporters and critics in a constructive and open fashion. DG Move feedback assures that the analysis are fully in line with the Commission's guidelines for CBAs study's.

Therefore, we urge you to stop spreading false claims and misinterpretations regarding the role and position of the European Commission services regarding the Rail Baltica Global Project CBA.

No "Yes" or "No" would have been sufficient for an answer. We take it as a negative answer, i.e. that RB Rail AS has not submitted the final CBA either to DG Move or to DG Regio. Please confirm.

We would like to recall the following:

• Open discussions (in fact, more like presentations) were arranged prior to the publication of the "full" report.

• The published report is missing detailed calculations, several references are not available and it is full of typos and contradictions. It lacks formal quality assurance and checking procedures (no names of authors, checkers, or approvers).

• Issues concerning the report were discussed in public on 8 June 2017 in a conference room of the Estonian Parliament. RB Rail AS was invited but did not attend the event.

• RB Rail has referred only to the preliminary feedback that obviously does not contain the auditing of the CBA.

7. Please advise the names and titles of the experts who have approved the CBA as stipulated in your reply 8.06.2017.[39]

Global Project CBA was carried out over a span of one and a half years in accordance not only with the Terms of Reference agreed by key project stakeholders, but also fully in line with the Guide to Cost-Benefit Analysis of Investment Projects released by the European Commission. The compliance of the CBA report with these Terms of Reference was consistently monitored by a Steer-

No The answer does not address the question. Please give the following information regarding the experts: given names, surname, title, and organisation.

[39] Appendix 4

ing Committee involving key project stakeholders from all three Baltic States – Rail Baltic Estonia, Eiropas dzelzceļa līnijas, Lietuvos Geležinkeliai, Lithuanian Ministry of Transport and Communication and RB Rail. From Estonian side, also Ministry of Economic Affairs and Communications as well Finance Ministry internal and external experts were involved. In addition, its compliance with the EU CBA Guide was examined by and further improved based on the suggestions of an experienced external reviewer. The CBA was subsequently approved by the RB Rail Management Board and, thereafter, and positively noted by the RB Rail Supervisory Board.

8. Has CBA got approval from EY internal quality checking? If so please provide the copy of the certificates. The report is lacking the QA/QC information.

By tendering any study, RB Rail AS expects that any contractor has comprehensive internal quality systems in place and professional approach is used for delivering trustful results.

Regarding EY internal quality procedures, please kindly contact EY.

Yes

Based on the answer, we understand that RB Rail AS blindly trusts its contractual party and has no intention of requesting any formal proof of QA/QC procedures. The EY report is clearly lacking QA/QC procedures and the poor quality of content is not what we would assume from a trustworthy and reasonably competent partner.

ARB asked the same question from EY on 26 June 2017 and received no reply.

9. Please publish the detailed calculations that were not provided in the published CBA. The largest issue concerns the truck air pollution rate in motorways (10 €ct/km) that is used in the calculation of the socio-economic benefit. The total undiscounted value obtained from this assumption is 3.3 billion euro, about 20 percent of the total socio-economic impact. According to the referenced source, such an air pollution rate corresponds to EURO I or EURO II trucks. During the time 2026–2055, it would be reasonable to expect EURO VI or better trucks to be used. The emission rate for these trucks is 25 times lower, as shown in the referenced source (0.4 €ct/km). This correction results in a 3 billion euro reduction of the socio-economic benefit.

Same as question No. 3. See our response to answer No 3.

No

The request for calculations has been deleted from the question by RB Rail. The calculations have not been provided.

10. Please publish detailed calculations that were not provided in the published CBA. The correction of the long-haul road transport vehicle type reduces the undiscounted socio-economic benefit by 220 million euros.

See the response to question No 3.

No

The request for calculations has been deleted from the question by RB Rail. The calculations have not been provided.

11. Please publish detailed calculations that were not provided in the published CBA. The correction of the predicted fuel excise growth decreases the undiscounted socio-economic benefit by 930 million euros in addition.

See the response to question No 2.	No	The request for calculations has been deleted from the question by RB Rail. The calculations have not been provided.

12. Please publish detailed calculations that were not provided in the published CBA. We notice that direct GHG emissions and other environmental impacts caused by the construction process and the new railway corridor have not been considered in the socio-economic impact calculations thus presenting the project more favourable than it actually is.

See the response to question No 5.	No	The request for calculations has been deleted from the question by RB Rail. The calculations have not been provided.

13. Please publish detailed calculations that were not provided in the published CBA. The cost savings of the rail freight on page 179 (table 77) and on page 75 (table 26) of the CBA shows example calculations of terminal to terminal rail freight costs, comparing them with door to door road freight costs. This fails to consider the costs it takes to ship freight from a customer's door to the railway terminal and from the destination railway terminal to the customer's door. Failure to account for door to terminal and terminal to door costs of rail transport overestimates the benefits i.e. cost savings of the rail freight and expected operator fees.

The cost savings are calculated considering relevant comparable distances (between major freight terminals). The so-called "last mile" deliveries from a customer's door to the railway terminal are assumed to be done by truck, so no savings accounted for this section in the CBA. The information in the tables represents selected examples to demonstrate the circumstances how Rail Baltica is expected to be competitive.	Yes/No	The request for calculations has been deleted from the question by RB Rail. The calculations have not been provided. • Since most of the road transport takes place as FTL (Full Truckload) or LTL (Less than Truckload) shipping as a door-to-door service without using any trucking terminals, it is apparent from the response of EY that the replacement of such road transport with rail transport would not be feasible due to the costs of the last-mile delivery. At least, the EY report does nothing to prove the opposite. • The remaining road transport (groupage and a smaller share of LTL freight) has been compared to rail transport from railway freight terminal to another railway freight terminal, without taking account the transportation costs from the railway freight terminal to the main trucking terminal. As further delivery or the last-mile delivery may only begin at the main trucking terminal, the failure to take into account the costs of transport from the railway freight terminal to the main trucking terminal

and other costs renders the cargo transport with the railway project more expensive and less competitive, and significantly reduces its socio-economic benefit.

Further explanation is provided on pages 26–28.

The additional replies from MTÜ ARB to comments of RB Rail AS

1. What kind of heavy truck type has been chosen in the assumptions "Heavy Truck Fuel % of OPEX 25%", and why?

In its reply, RB Rail and EY made again the same mistake of reading the wrong figures from the referenced source. Appendix 9 includes a copy of the source, referred to on page 147 of the EY report, where all possible vehicle types that could be reasonably used for long-haul transport are highlighted by ARB. The fuel cost of such vehicles ranges between 27–32% (not 25–30% as RB Rail and EY claim). The most used vehicle type could be even the 44t (3+3) artic that has a range of 31–32% that is even further away from the value EY used in the calculations.

A study by ifeu - Institut für Energie- und Umweltforschung Heidelberg GmbH suggests that the average fuel consumption for road transport of about 13.7t payload is about 30 l per 100 km[40].

The average street price of fuel in the Baltic States (as of 28 October 2017) is 0.852 €/l[41].

30 l/100 km * 0,852 €/l = 25.65 €ct/km.

We stated in our analysis[42] that 24 €ct/km corresponds to the actual situation today. The reputable source referred to above provides a rate of 25.65 €ct/km – this rate is even farther away from 19 €ct/km that is used in the EY report.

According to the claims of RB Rail and EY,[43] the fuel consumption figures used in the EY report have substantiated during discussions with the interviewees active in the local industry as follows:

Vehicle operating costs per vehicle-km for trucks: 0.8 €[44]
Heavy truck EBIT margin: 6%
Heavy truck fuel % of OPEX: 25%[45]
0.8 € * (100% – 6%) *25% = 0.19 €

However, the fuel cost of 19 €ct per km would mean an average fuel consumption of:

19 €ct/km ÷ 0,852 €/l = 22 l/100 km

This value is well below the results of the eco-driving competition winner (26.5 l/100 km)[46]. Using such unrealistic fuel consumption value in one part of the calculation and assuming the fleet will get older and give off more emissions at the same time is illogical and gives reason to believe that EY uses a biased approach throughout the study.

3. What kind of heavy truck type is used in the assumptions for external costs for trucks of 0.1 EUR/vkm in the motorway and 0.22 EUR/vkm in the city, and why?

[40] Appendix 12
[41] Appendix 10
[42] Appendix 3
[43] Appendix 5
[44] EY report, p. 146. *http://railbaltica.org/wp-content/uploads/2017/04/RB_CBA_FINAL_REPORT_0405.pdf*
[45] *Ibid., p. 147*
[46] Mercedes-Benz Actros in the Fuel Duel: 1000 fuel-consumption comparison tests in Europe: more than ten percent consumption advantage over the competition. Daimler. 8 May 2015. *http://media.daimler.com/marsMediaSite/en/instance/ko.xhtml?oid=9919871*

We agree that the incremental approach requires a counterfactual scenario called BAU or "Do Nothing" that is the most likely and realistic. In case of uncertainty, a risk analysis (a sensitivity analysis) should be performed at the end of the study, and there is no reason to use a "conservative approach" as the competing (counterfactual) scenario. However, what EY has actually used is a contra-conservative approach where the project benefits have been overestimated and the competition has been minimised.

At the moment of preparation, the forecast should also consider the relevant EU regulations such as EU Directive 582/2011 that prohibits selling new vehicles not meeting the EURO VI requirements from year 2014[47]. Also, there are motivational tolls on many EU roads today and metropolitan areas are putting restrictions in place for lower emission class vehicles[48] rendering the use of older high emission vehicles unfeasible.

It would be naive to expect that the EU can meet its environmental targets regarding transport simply by building railways to compete with old trucks.

In contrast to the above, RB Rail and EY are trying to claim that the EU directives have no leverage and the business as usual would mean that the trucks on EU roads will be even older during the project appraisal period than they are today. This is neither logical nor legal, thus it is unrealistic.

However, we do agree with the following claims RB Rail and EY have made:

1) The current HGV fleet composition in the Baltics is older than the EU average.
2) The average HGV fleet age in the EU has increased during past 14 years by about 0.6 years, i.e. from 7.5 years to 8.1 years[49].
3) In the ARB study, the EU average emission external cost figures were used instead of the figures specific for the Rail Baltica region. It was an intentional choice for simplification purposes. In the current reply, specific figures for the Baltic States are being used.

The following claims of RB Rail and EY are biased to support the project scenario in the EY report:

4) According to the forecasts, roughly 1/3 of the RB freight "shall originate in or travel to the CIS region" where emission regulations are delayed up to 10 years. Therefore, the corresponding amount of the replaced truck vehicle kilometres should be calculated using a substantially higher emission rate than for the projected fleet composition in the EU.

The Russian national regulation referenced by RB Rail and EY does not mean that road transport companies will use these vehicles for international transport that the RB is trying to compete with. Higher road tolls and entry restrictions to metropolitan areas make it unfeasible to use low-emission-vehicles in the European Union.

5) RB will most likely replace the oldest vehicles with the lowest emission class.

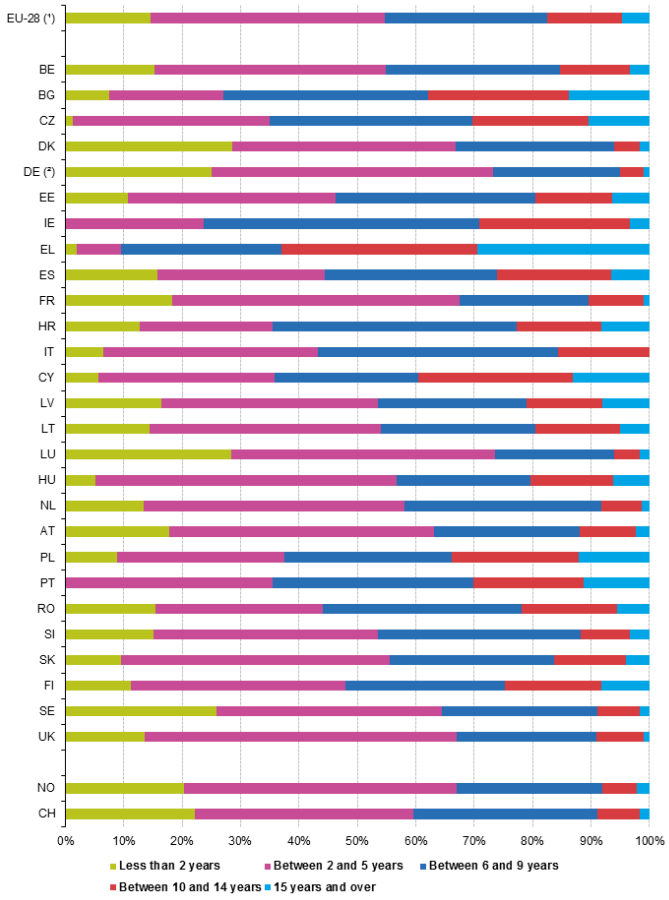
RB could potentially replace some trucks that are used for long-haul international transport. For that purpose, the newest trucks are mostly used (according to Eurostat[50], only less than 35% of road trac-

[47] Commission Regulation (EU) No 582/2011 of 25 May 2011.
http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32011R0582
[48] Urban Access Regulations in Europe. *http://urbanaccessregulations.eu/overview-of-lezs*
[49] Appendix 11

tors that are mainly used for international transport are older than 10 years, while over 80% of other goods vehicles are older than 10 years). The older "Other goods vehicles" are mainly used for local transport. RB will not compete with nor reduce the local transport; quite the opposite, it will increase the local transport since RB will depend on the road transport from the client's door to the rail terminal and vice versa. On the other hand, if RB decreased the need and possibilities for investing into road rolling stock, and if older vehicles were used for servicing short legs from the terminal to the client's door, then the project scenario would increase the vehicle emission cost, not decrease it in comparison to the base scenario claimed by EY.

6) "As of 1 May 2017, the share of Euro 0-II class vehicles registered for international freight shipments in Latvia was still above 20%." – This claim of EY is unfounded. EY has not provided a direct reference to the claimed source. For these reasons, we cannot accept their claim.

As RB Rail and EY have referenced, currently about 20 percent of the vehicle kilometres are driven by vehicles older than ten years; this does not prove their claim that they are of EURO I or II vehicle class, because according to Eurostat, the biggest share of these vehicle kilometres is driven by trucks that are 10–15 years old and are of higher than EURO II vehicle class. According to Figure 3, currently only about 6 percent of the vehicle kilometres in the Baltic States are driven by trucks that are older than 15 years and could be of EURO I or II class[51].



(*) EU-28: provisional data for reference year 2015; Malta excluded (see chapter "data sources and availability")
(*) DE: 2014 data was used for reference year 2015.

Figure 3. Annual road freight transport, by age of vehicle.

Projection of the vehicle fleet

According to the European Environment Agency, the average age of the HGV fleet in EU was 8.1 years in 2014[52].

According to the vehicle fleet composition projections made by National Atmospheric Emissions Inventory (UK)[53] for the year 2023, there will be no vehicles in the UK whose emission class is lower than EURO VI. Even if there is a delay of 10 years in the Baltic States compared to the UK, there will be no vehicles with emission class lower than EURO VI during the main part of the referenced period 2026–

[50] Eurostat: Lorries and road tractors, by age.
http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=road_eqs_lorroa
[51] Eurostat: Annual road freight transport, by age of vehicle (Mio Tkm, Mio Veh-km, 1000 Jrnys).
http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=road_go_ta_agev
[52] Appendix 11
[53] National Atmospheric Emissions Inventory. *http://naei.beis.gov.uk/data/ef-transport*

2055. It should also be noted that the current difference between the UK and the Baltic States in the average age of heavy trucks vehicle fleet is much less than ten years[54].

EY has not submitted a detailed breakdown of vehicle emission classes during the RB payback period, i.e. for 2026–2055. In our analysis[55], we have stated that with a satisfactory degree of generalisation, nearly a 100% of the vehicles are at least of EURO VI emission class.

In order to prove the statement above, we shall submit a projection of freight volumes by emission class. According to the projection, 97.7 % of the freight volume during 2026–2055 will be transported using at least EURO VI emission class vehicles[56]. Considering the mix of emission classes and the unit prices of the average external transport cost in the Baltic States[57], the weighted average air pollution cost of vehicles will be 0.35 €ct per vehicle km. This is below the value proposed by EY (10 €ct/km) and even less than we used in our initial analysis[58].

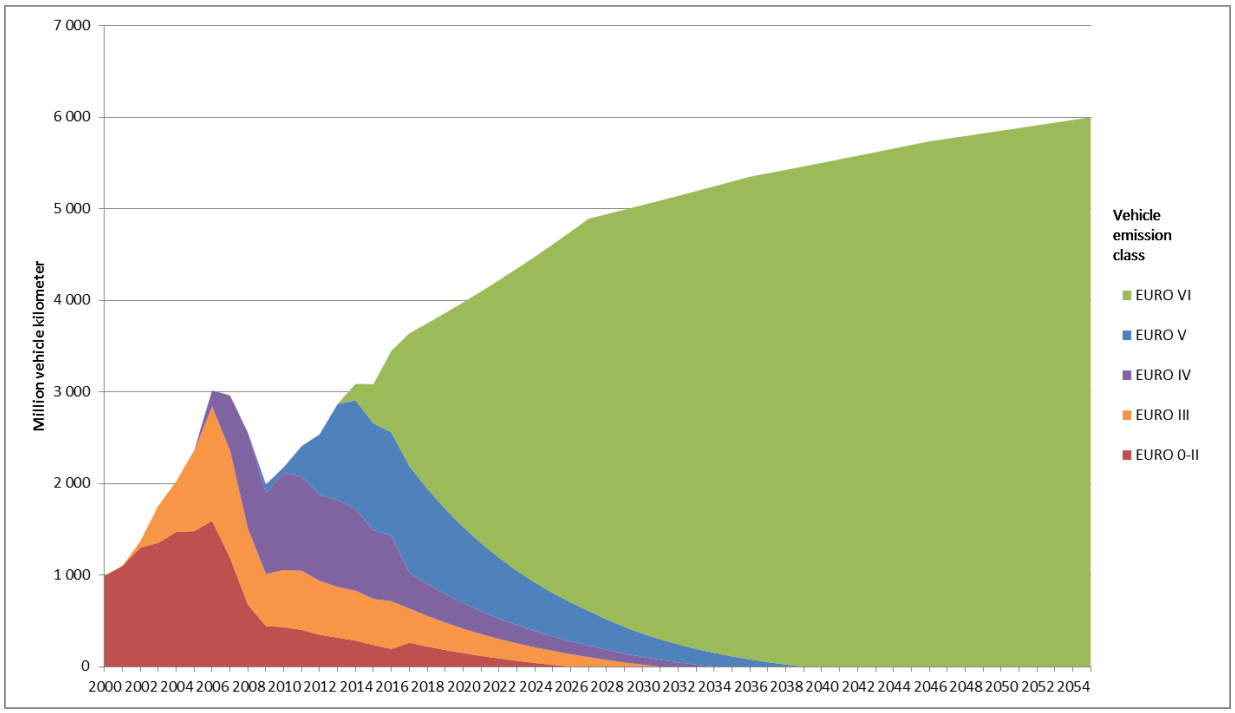


Figure 4. Projection of road transport volumes by vehicle emission class [59].

In their response, RB Rail and EY have submitted the following statements that we find to be biased:

1) RB Rail and EY refer to the pollution norms established in Russia for domestic vehicle transport, claiming that due to these norms up to one-third of the vehicles on our roads correspond to the EU pollution norms from 10 years ago.

2) Due to the RB, the oldest part of the fleet will be withdrawn from traffic.

[54] Appendix 1, Figure 5
[55] Appendix 3
[56] Appendix 1
[57] Appendix 2
[58] Appendix 5
[59] Appendix 1

Figure 5 shows the projection of vehicles broken down by their emission class according to the claims of EY. Even when assuming that it is the oldest part of the fleet that will be withdrawn, the use of EURO II emission class for all the vehicles to be withdrawn is definitely not justified. The pollution impact described in the EY CBA could be illustrated as shown in Figure 6; this cannot be considered logical at all.

To summarise our statements above, the graphs show that even using the rather biased assumptions suggested by RB Rail and EY, the result is far from the value (10 €ct/vkm) used in the EY Report.

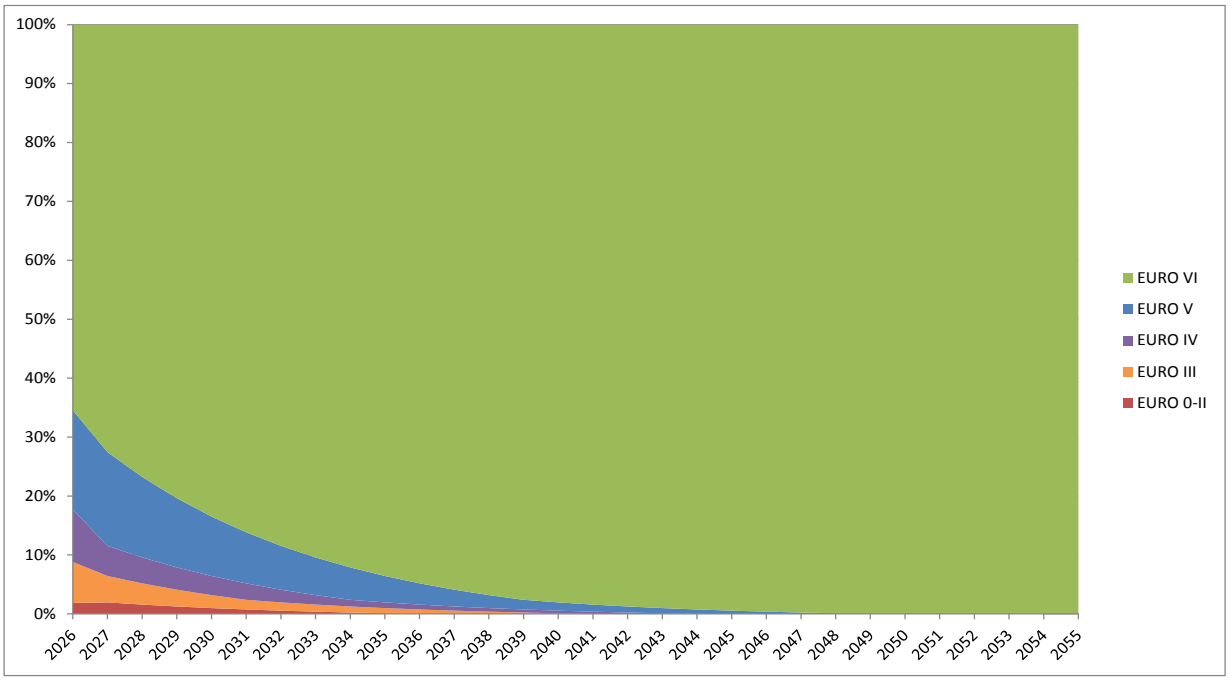


Figure 5. 2/3 Baltic fleet + 1/3 CIS fleet (EY suggested assumption 10 year lag from EU average).

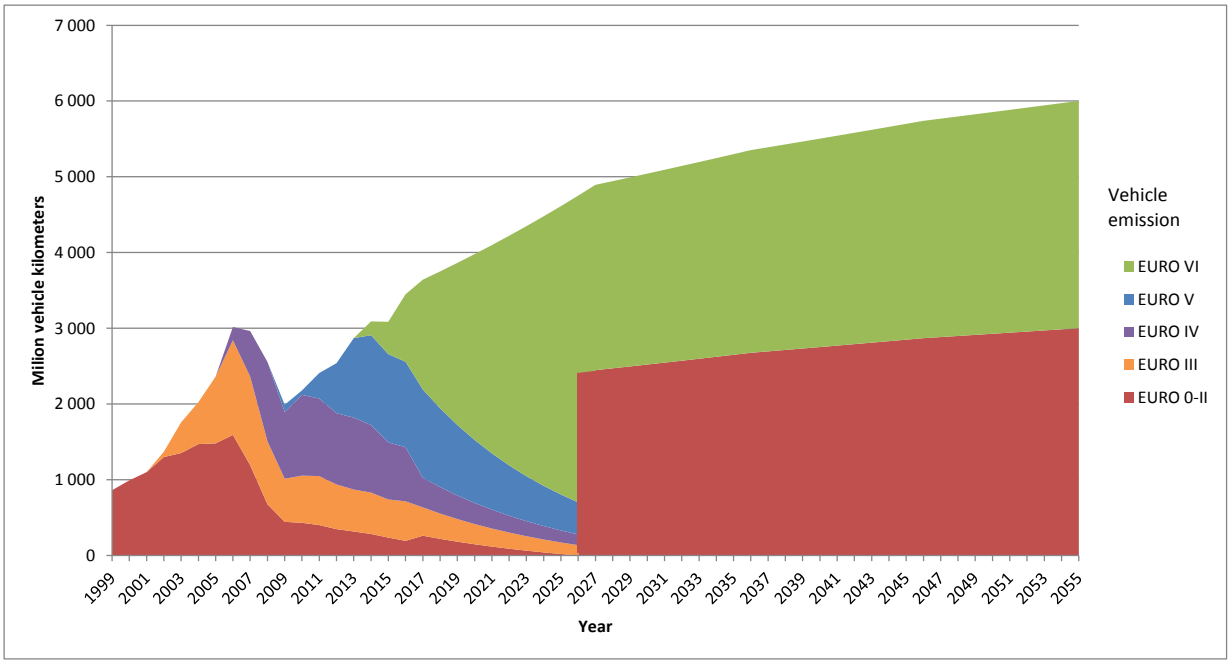


Figure 6. Wrong assumption of the fleet mixture EY has used in CBA (EY report).

13. Please publish detailed calculations that were not provided in the published CBA. The cost savings of the rail freight on page 179 (table 77) and on page 75 (table 26) of the CBA shows example calculations of terminal-to-terminal rail freight costs, comparing them with door-to-door road freight costs. This fails to take into consideration the costs of shipping freight from a customer's door to the railway terminal and from the destination railway terminal to the customer's door. Failure to account for door–to-terminal and terminal-to-door costs of rail transport overestimates the benefits i.e. cost savings of the rail freight and expected operator fees.

The following short explanation is based on the study "Analysis of the EU Combined Transport"[60].

Continental cargo transport comprises two distinct market segments, the full/part-load (FTL/LTL) traffic and groupage/parcel services. The latter business requires extraordinary service parameters: fast transit times and a >99 % level of reliability. Logistics service providers offer overnight services on all inland trade lanes guaranteeing a 24-hour door-to-door transport and a 48-hour service on virtually all cross-border trunk routes in the EU, with a few exceptions. Combined transport rail/road operations (e.g. Rail Baltica service) can rarely comply with this service level, due to the time required for pick-up and delivery and terminal handling.

As competition is intense, production costs are critical. Therefore service providers have optimised and industrialised their operations. It is not expected that these requirements will relax in future with less demanding service profiles. In contrast, the current trends as concerns, for example, e-commerce or the reduction of stocks at supermarkets rather indicate an acceleration of the transport of small shipments. The e-commerce sector is increasingly moving towards next-day or same-day delivery networks. A mode shift potential for any railway service is therefore not likely to emerge from these markets[61].

The situation is different in the full/part-load business. But right now, most of these volumes are trucked from customer's door to customer's door and they are not transshipped through terminals. EY has made no analysis and has provided no calculations regarding whether the Rail Baltica rail transport between terminals combined with the cost and time related to additional handling and short distance trucking to/from the customer's door is competitive in comparison with today's business models (road and/or sea transport) or not.

Therefore, based on the answers of RB Rail and EY we can deduct the following:

1. RB Rail and EY claim that freight transport by Rail Baltica is definitely competitive in comparison with the road freight transport from main trucking terminal to main trucking terminal. Such terminal-to-terminal carriage of goods by road only covers small consignments, i.e. groupage freight shipments, and a smaller part of the LTL freight. However, it is important to note that the transport of small consignments only constitutes a small share (10 to 20%) of the total road freight transport. FTL and LTL freight constitutes the remaining 80 to 90%, and a vast majority of these consignments are transported door-to-door using long-haul trucks. It must be admitted that due to complexity there are no exact and good data available about European road freight market distribution be-

[60] KombiConsult , Intermodality, Planco and Gruppo CLAS. Analysis of the EU Combined Transport. Final Report. January 2015, p. 132. *https://ec.europa.eu/transport/sites/transport/files/themes/strategies/studies/doc/2015-01-freight-logistics-lot2-combined-transport.pdf*
[61] *Ibid., p. 133*

tween Full-Truck-Load (FTL), Less-Then-Truck load (LTL) and groupage. Market participants do estimate that the share of groupage in the total road freight in terms of tonnage is between 10–20%. The share is larger in Western Europe and smaller in Eastern Europe[62]. In the latest study of the Fraunhofer Center, the same conclusion regarding the distribution is reached[63]. The Fraunhofer' study shows that the annual sales of FTL services are € 86 bn and the summarized annual sales of LTL and groupage services are € 45 bn. When we consider that the share of LTL is not smaller than the share of groupage, and that sales in euros per ton are higher in groupage than in FTL and LTL, then it should be concluded that the European groupage market share in terms of tonnage is about 10-20% of all road freight. FTL shipments and the majority of LTL freight shipments are not delivered via trucking terminals. In the case of RB, 30 to 40 % of the total road freight transport is said[64] to be transferred to railway, i.e. a modal shift is expected. As it turns out, this claim is unfounded; therefore, the assessment conducted by EY regarding the rail freight traffic volume is greatly overestimated. In addition, according to the CBA Guide, such changes must be modelled, i.e. the modal shift should be based on models, not on estimates.

2. Trailers (or containers) with small consignments must be delivered from a rail freight terminal to a main trucking terminal, i.e. a groupage shipments terminal. This is because the further delivery of groupage shipments of various operators from the rail freight terminal is not possible, since the handling of operations of shipments is highly industrialised. Therefore, it is important to note that the costs of road transport from a rail terminal to a main trucking terminal, i.e. a groupage shipments terminal, have not been accounted for in the CBA conducted by EY. Due to these costs, the socio-economic benefit of Rail Baltica is reduced and the competitiveness of RB is actually decreased since the costs of rail freight transport are higher, but EY has failed to take this into account.

3. It should be reiterated that a study conducted by the KombiConsult[65] showed that a large-scale carriage of small consignments by rail is not possible in Europe and the volumes of such freight will be marginal. This is due to the reason that for small consignments, rail freight transport is neither quick enough nor competitive in terms of costs, and in reality such rail freight is only possible between the terminals belonging to one particular operator's network. Such operators may include, for example, DHL, Dachser, ACE Logistics, etc.; but for them, it does not matter whether to outsource the transport of goods between main trucking terminals to a trucking company or to a freight rail operator. Since the market for small consignments in Europe is highly fragmented, RB cannot provide a sufficiently quick freight service between the terminals of particular operators in the volumes necessary for the railway to be viable. One reason is an earlier claim that different operators, such as DHL and Dachser, cannot use the same railway terminal or main trucking terminal for further distribution of goods. Therefore, the logic in the EY CBA study about the competitiveness regarding transport of small consignments is in conflict with earlier studies and daily reality.

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[62] *J. Joensuu.* European Groupage Network. Spring 2013, p. 21. *http://www.theseus.fi/bitstream/handle/10024/56838/Joensuu_Juhamatti.pdf*

[63] Fraunhofer Center: Top 100 in European Transport and Logistics Services 2015/2016, Executive Summary p. 4. *https://www.scs.fraunhofer.de/content/dam/scs/de/dokumente/studien/Top%20100%20EU%202015%20Executive%20Summary.pdf*

[64] Appendix 7

[65] KombiConsult , Intermodality, Planco and Gruppo CLAS. Analysis of the EU Combined Transport. Final Report. January 2015, p. 133. *https://ec.europa.eu/transport/sites/transport/files/themes/strategies/studies/doc/2015-01-freight-logistics-lot2-combined-transport.pdf*

4. The EY CBA study lacks proof that the rail freight transport by Rail Baltica is competitive with FTL and LTL freight by road (i.e. with such freight that is transported from shipper's door to consignee's door). The response submitted to us indicate that RB Rail and EY do not find Rail Baltica competitive in terms of FTL and LTL freight that constitutes a vast majority of road freight transport. If FTL and LTL freight by Rail Baltica is not competitive, there will be no modal shift from the roads to the railroad and the railway will be underutilised.

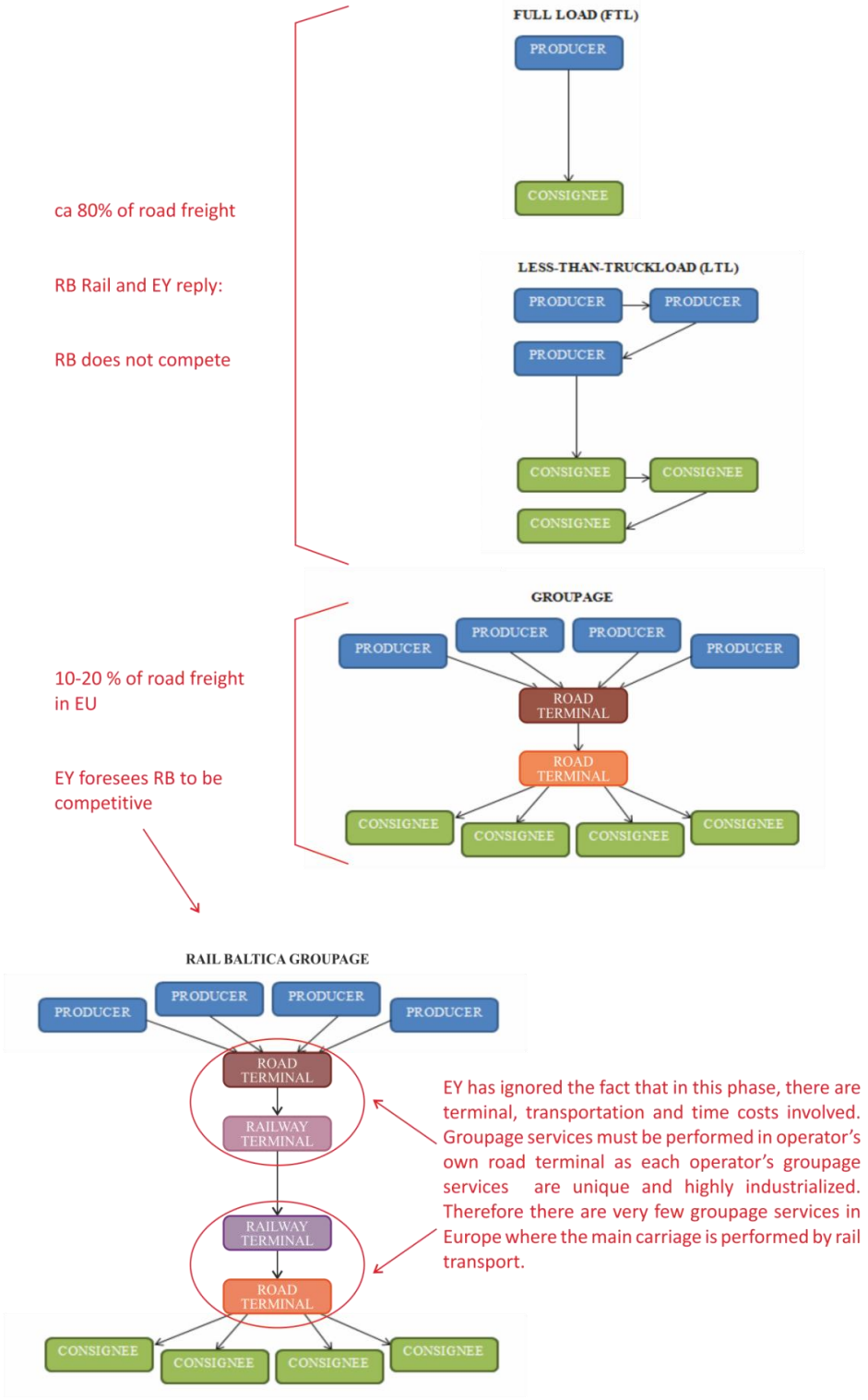

Figure 7. Typical phases of international FTL, LTL and groupage shipments.

About the authors

The authors have analysed the Cost-Benefit Assessment of Rail Baltica prepared by EY pro bono publico. None of the authors or any individuals or legal entities related to them have received any benefits for the work done.

Links between the authors and the Rail Baltica project:

Priit Humal has studied physics in Tartu University and is a member of the Management Board of civic movement Openly about Rail Baltic (MTÜ ARB). The objectives of the civic movement are as follows:

1. Estonia will have a reasonable and feasible railway connection to Europe.
2. The railway will be located where the damages to the living environment are the least detrimental.
3. In designing, constructing, and using the railway, regional interests are taken into account.
4. The design of the railway is science-led, honest and transparent, and involves local communities in a meaningful way.
5. The damages caused by the construction and use of the railway are compensated in a fair manner.

Priit Humal has also published notes about the previous cost-benefit assessment of Rail Baltica prepared by AECOM.[66]

Karli Lambot has graduated from the University of Tartu with a degree in corporate finance. He is a supporting member of MTÜ ARB and a shareholder and member of the Supervisory Board of the logistics company ACE Logistics Group AS. Based on the profile of ACE Logistics, the company might be a potential customer of Rail Baltica. Karli Lambot has participated in the preparation of this document as a private individual, not a representative of the company. He was the responsible author and editor of Logistics Handbook (Logistika Käsiraamat, Äripäeva, 2003–…) and has been a lecturer of logistics in the University of Tartu Pärnu College.

Illimar Paul has a MSc. in economics. He is a Managing Partner, Supply Chain Management expert and consultant in Sensei OÜ, and a member of MTÜ ARB. He has been working as the country manager for Maersk Logistics and in several other logistics companies. Illimar Paul is a Honorary Member of PROLOG (Estonian Supply Chain Management Association).

Raul Vibo has a MSc. in transport engineering. He has managed various road construction projects that have included environmental impact assessment and feasibility analyses in accordance with the EU guidelines: Vaida-Aruvalla, Kose-Mäo, Rõmeda-Haljala, Eastern bypass in Tartu.

He has participated in various other projects as well. For 4.5 years, he worked in the Estonian Road Administration as the manager of the Planning Department where he participated in all current international highway projects financed by the World Bank or the EU Cohesion Fund.

All the authors of this document also signed the joint statement of 222 public figures to the Estonian Parliament requesting that the intergovernmental agreement for the development of Rail Baltica be not signed.

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[66] *P. Humal.* Rail Baltica being planned on basis of faulty study. 15.04.2014
http://avalikultrailbalticust.ee/AECOM%20study%20errors%20(Priit%20Humal).pdf

Appendixes

Appendix 1

Estimation and projection of vehicle kilometres in road freight transport by emission class from 1995 until 2055

The TREMOVE database is a widely used source of aggregate emission factors, broken down by country, type of region, type of vehicle, and vehicle technology. It provides data for road, rail, air, and inland waterway transport in Europe. The latest publicly available version is TREMOVE v.3.3.2.[67] In TREMOVE, the relevant emission factors from COPERT v4 are used.

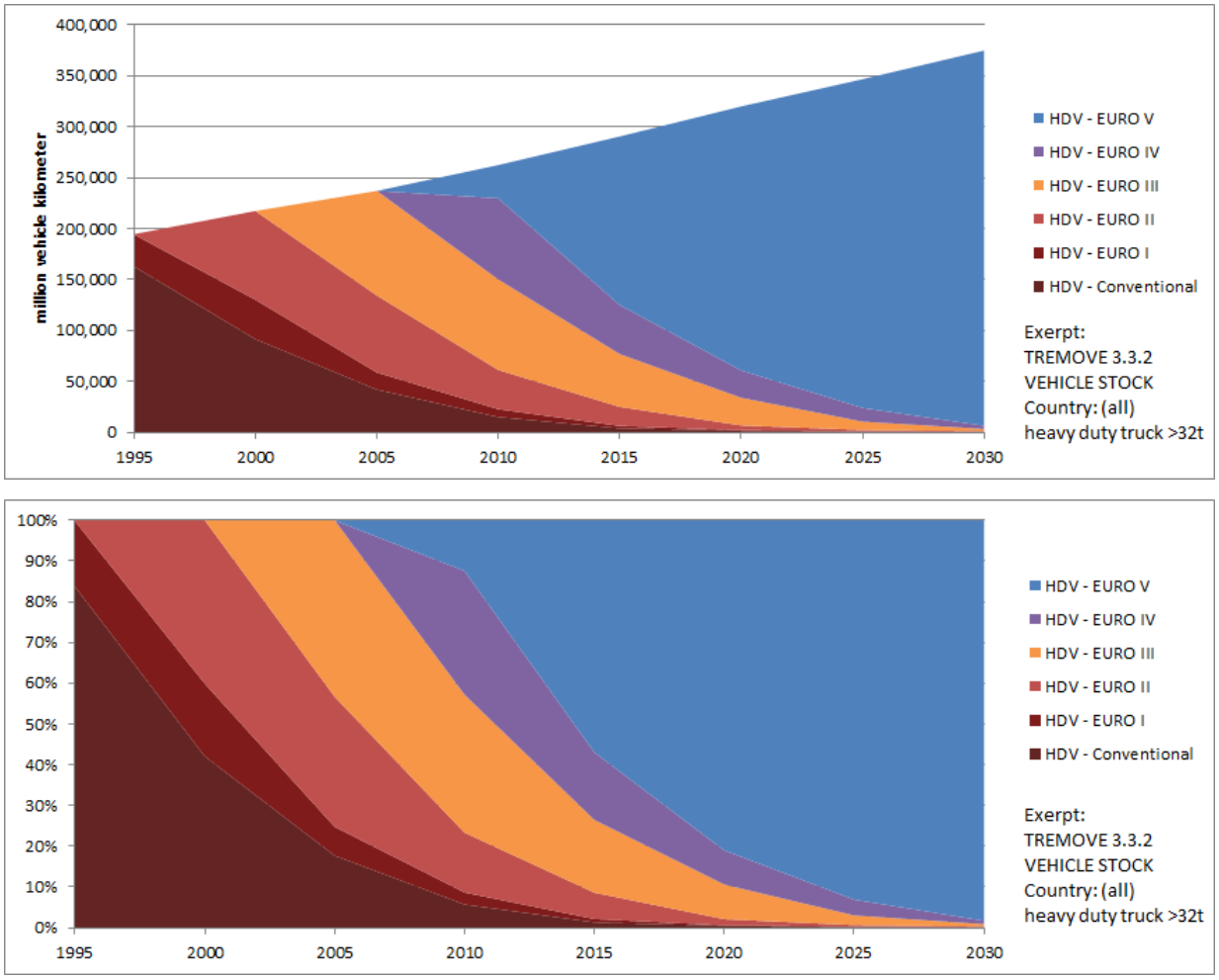


Figure 1. The Fleet composition (EU) Tremove database 3.3.2.

[67] Tremove Model Software.
https://web.archive.org/web/20120412031537/http://www.tremove.org:80/model/index.htm

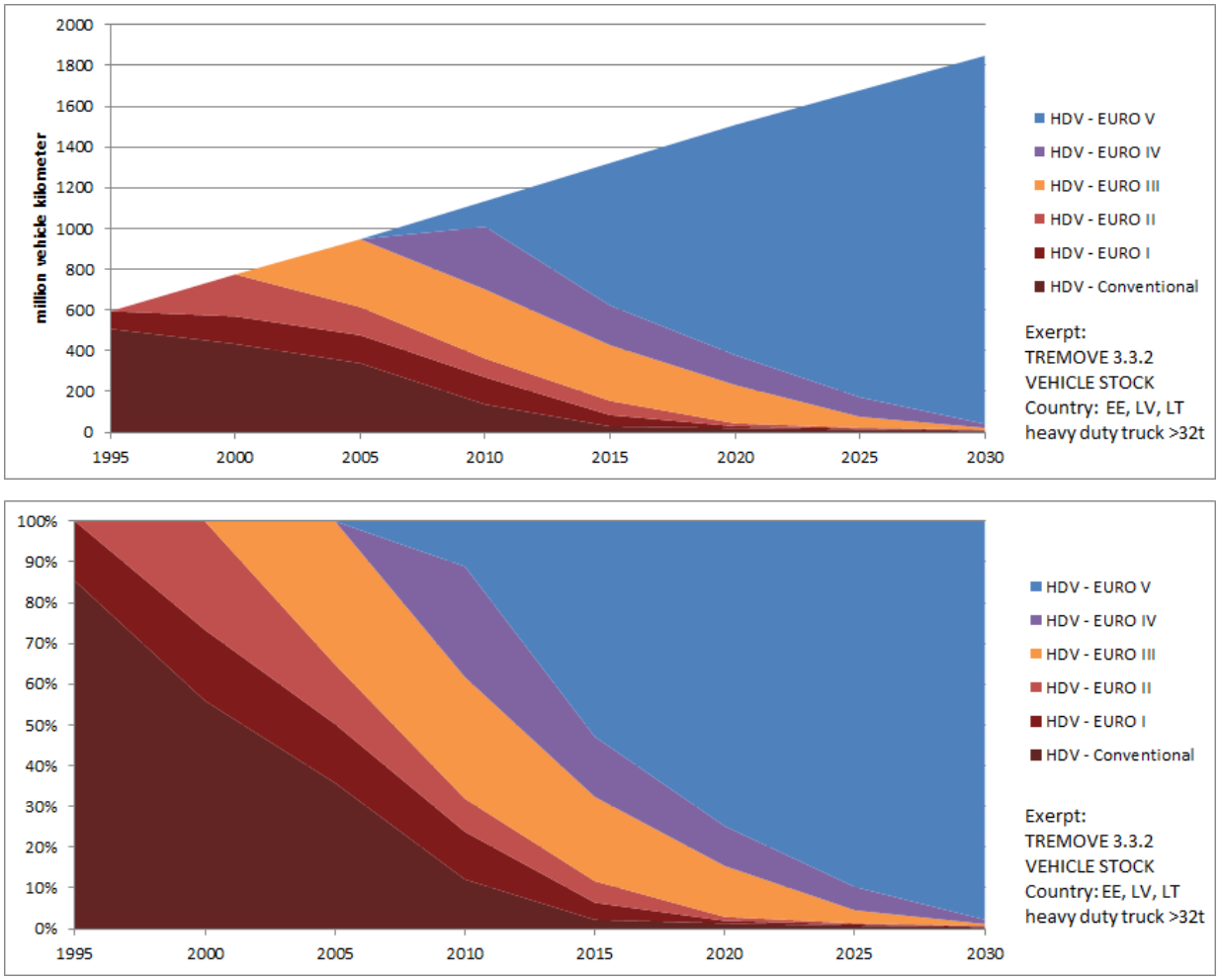


Figure 2. The Baltic fleet composition, Tremove database 3.3.2.

The HDV composition diagrams under Figure 1 show the average fleet composition in the EU, and Figure 2 shows the same information for Estonia, Latvia, and Lithuania. According to the figures, there is no significant difference in the averages for the Baltic States and the entire EU, and after 2025 the share of vehicles in the emission class EURO II and lower is basically inexistent. Tremove 3.3.2. was prepared in 2010, i.e. before the EURO VI standards were implemented.

We use the principle of the Tremove 3.3.2. model[68] for estimating the emission class of the vehicles based on their age structure. For example, all new vehicles sold between 2001 and 2005 are considered to be EURO III vehicles. All vehicles manufactured since 2014 must be of EURO VI class. A similar principle for determining the emission class has been used in the Astra model as well.[69]

[68] TREMOVE 2.2 Model and Baseline Description. 7 December 2004, p. 59. *http://www.asser.nl/upload/eel-webroot/www/documents/TREMOVEreport.pdf*

[69] *W. Schade, N. Helfrich, A. Peters.* A Transport Scenario for Europe until 2050 in a 2-degree World, July 2010, p. 13 *http://www.astra-model.eu/pubblication/WCTRS_SCHADE_Transport_Scenario_until_2050_in_2_Degree_World.pdf*

EU Emission Standards for HD Diesel Engines, g/kWh (smoke in m^{-1})

Tier	Date	Test	CO	HC	NOx	PM	Smoke
Euro I	1992 (< 85 kW)	R-49	4.5	1.1	8.0	0.612	
	1992 (> 85 kW)		4.5	1.1	8.0	0.36	
Euro II	October 1996		4.0	1.1	7.0	0.25	
	October 1998		4.0	1.1	7.0	0.15	
Euro III	*Voluntary EEV (October 1999 to January 2013)*	*ESC & ELR*	*1.5*	*0.25*	*2.0*	*0.02*	*0.15*
	October 2000	ESC & ELR	2.1	0.66	5.0	0.10 0.13[a]	0.8
Euro IV	October 2005		1.5	0.46	3.5	0.02	0.5
Euro V	October 2008		1.5	0.46	2.0	0.02	0.5
Euro VI	January 2013	WHSC	1.5	0.13	0.4	0.01	

Notes:a – for engines of less than 0.75 dm^3 swept volume per cylinder and a rated power speed of more than 3000 min^{-1}

EEV – enhanced environmentally-friendly vehicles

Figure 3. EU Emission Standards[70].

The Eurostat table 'Annual road freight transport, by age of vehicle' [road_go_ta_agev][71] for the years 2003–2016 shows the statistics of the mileage of vehicles used for road freight transport in the Baltic States, with the following age class options: Less than 2 years, 2 years, 3 years, …, 9 years, From 10 to 14 years, 15 years or over. In order to determine the emission class, the vehicle age given as a range must be broken down to years. For that purpose, we use the exponential regression model based on the data points given in the baseline data, as illustrated on Figure 5.

GEO	Baltics													
UNIT	Million vehicle-kilometres (VKM)													
AGE/TIME	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total	2 017	2 042	2 302	2 874	2 850	2 534	1 978	2 145	2 400	2 522	2 823	2 984	2 935	3 248
Less than	232	235	329	526	602	701	284	59	291	506	574	545	427	593
2 years	173	138	182	269	307	347	423	313	46	114	336	407	464	298
3 years	119	180	175	208	271	241	270	463	267	40	100	285	334	428
4 years	89	145	196	197	186	179	175	290	447	229	39	88	231	299
5 years	168	129	171	225	191	142	120	188	310	424	251	43	96	253
6 years	115	205	148	198	214	132	84	135	214	288	414	242	41	92
7 years	109	167	213	172	166	137	95	97	136	187	285	404	221	56
8 years	93	100	145	222	154	106	95	101	107	122	175	246	325	211
9 years	50	84	117	175	161	87	69	102	99	106	120	164	207	297
From 10 to	411	393	353	368	362	301	252	295	356	368	369	385	407	540
15 years o	266	246	258	301	224	153	110	100	126	136	159	175	180	179

Figure 4. Annual road freight transport, by age of vehicle (total for the Baltic States).

[70] TransportPolicy: EU: Heavy-Duty: Emissions *http://www.transportpolicy.net/standard/eu-heavy-duty-emissions/*

[71] Eurostat: Annual road freight transport, by age of vehicle (Mio Tkm, Mio Veh-km, 1 000 Jrnys) *http://ec.europa.eu/eurostat/product?mode=view&code=road_go_ta_agev*

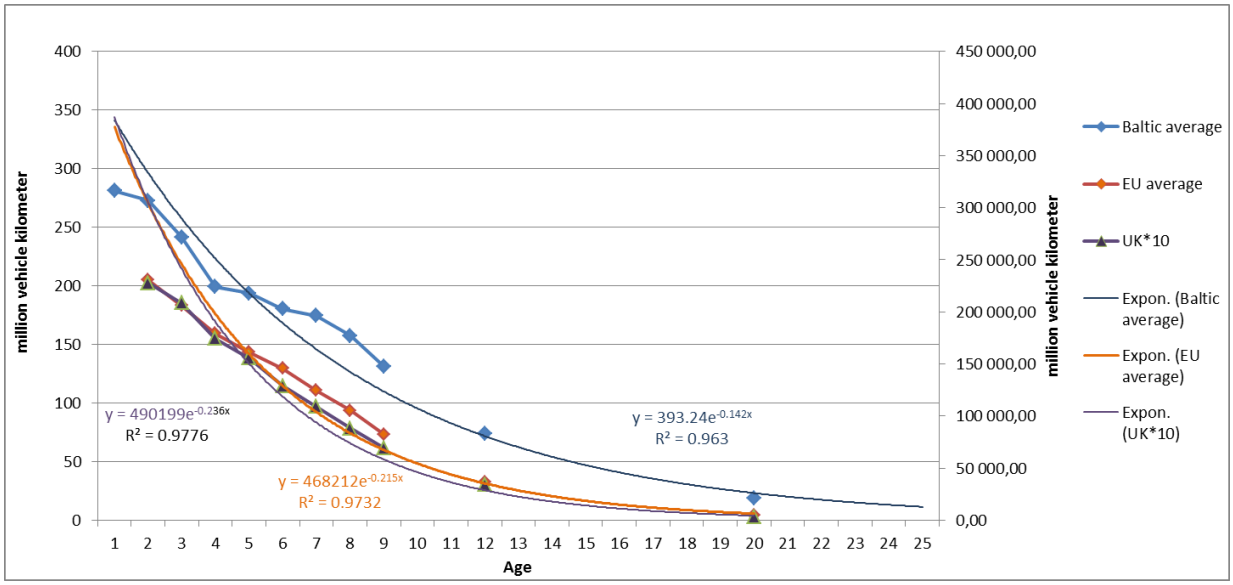


Figure 5. Baltic average annual road freight transports exponential regression Source Eurostat [road_go_ta_agev].

The table in Figure 6 shows information about particular years specified pursuant to the abovementioned method. Below the table, the road freight transport volumes of each emission class have been aggregated by years.

AGE/TIME	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
0	77	78	110	175	201	234	95	20	97	169	191	182	142	198
1	155	157	219	351	401	467	189	39	194	337	383	363	285	395
2	173	138	182	269	307	347	423	313	46	114	336	407	464	298
3	119	180	175	208	271	241	270	463	267	40	100	285	334	428
4	89	145	196	197	186	179	175	290	447	229	39	88	231	299
5	168	129	171	225	191	142	120	188	310	424	251	43	96	253
6	115	205	148	198	214	132	84	135	214	288	414	242	41	92
7	109	167	213	172	166	137	95	97	136	187	285	404	221	56
8	93	100	145	222	154	106	95	101	107	122	175	246	325	211
9	50	84	117	175	161	87	69	102	99	106	120	164	207	297
10	63	84	98	126	120	78	63	86	91	96	103	126	148	207
11	58	75	86	109	101	66	53	69	75	79	85	103	119	161
12	54	66	75	94	85	56	45	56	62	65	71	84	96	126
13	50	59	65	81	72	48	38	45	51	54	59	69	78	98
14	47	52	57	69	60	41	32	36	42	44	49	57	63	76
15	43	47	50	60	51	35	27	29	34	37	41	46	50	60
16	40	41	44	51	43	30	23	24	28	30	34	38	41	46
17	37	37	38	44	36	25	19	19	23	25	28	31	33	36
18	35	33	33	38	30	21	16	16	19	21	23	25	26	28
19	32	29	29	33	25	18	13	13	16	17	19	21	21	22
20	30	26	25	28	21	16	11	10	13	14	16	17	17	17
21	28	23	22	24	18	13	10	8	11	12	13	14	14	13
22	26	20	19	21	15	11	8	7	9	10	11	11	11	10
23	24	18	17	18	13	10	7	5	7	8	9	9	9	8
24	22	16	15	15	11	8	6	4	6	7	8	8	7	6
25	21	14	13	13	9	7	5	3	5	5	6	6	6	5
EURO 0-II	1 352	1 471	1 480	1 592	1 192	676	444	431	402	348	317	284	236	193
EURO III	405	553	882	1 250	1 169	831	569	623	647	590	554	546	503	522
EURO IV				175	602	1 048	882	1 066	1 024	941	950	892	753	715
EURO V							95	59	337	660	1 049	1 186	1 166	1 128
EURO VI												182	427	891

Figure 6. Baltic freight million vehicle kilometers broken down by years.

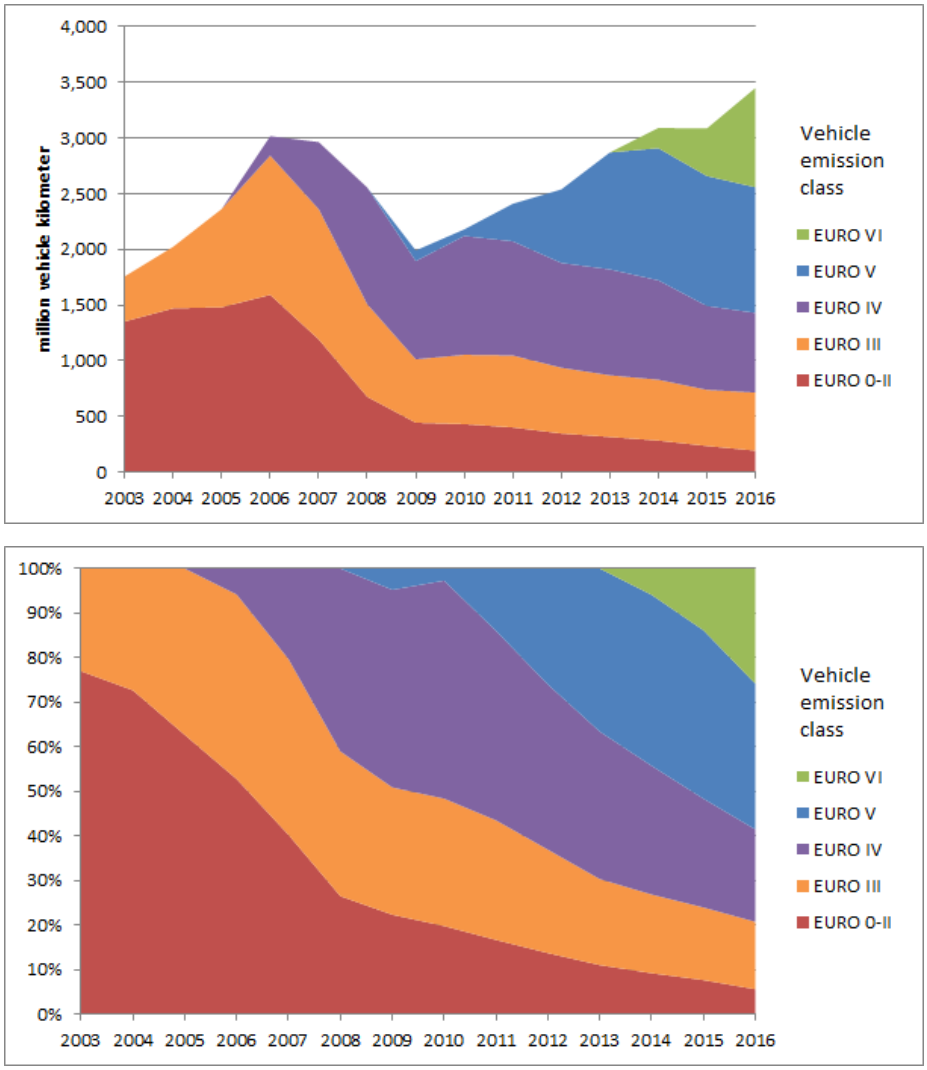


Figure 7. Average Baltic Vehicle fleet composition used for road freight.

For modelling the fleet composition projection for the years 2017–2055, we have used the average exponential regression curve of the previous period with the exponent $e^{-0.142*(\text{age of vehicle})}$. The increase in the freight transport volume is projected using the CAGR values specified in the EY report[72]. The results of the above-described modelling are presented in Figures 8 and 9.

[72] EY Report, p. 127. *http://railbaltica.org/wp-content/uploads/2017/04/RB_CBA_FINAL_REPORT_0405.pdf*

AGE/TIME	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
0	232	239	246	254	262	269	277	286	294	303	312	315	319	322	325	328	331	335	338	342
1	465	479	493	508	523	539	555	572	589	606	624	631	637	643	650	656	663	670	676	683
2	403	415	428	441	454	467	481	496	511	526	542	547	553	558	564	569	575	581	587	593
3	350	360	371	382	394	405	418	430	443	456	470	475	480	484	489	494	499	504	509	514
4	303	313	322	332	342	352	362	373	384	396	408	412	416	420	424	429	433	437	442	446
5	263	271	279	288	296	305	314	324	334	344	354	357	361	365	368	372	376	379	383	387
6	228	235	242	250	257	265	273	281	289	298	307	310	313	316	319	323	326	329	332	336
7	198	204	210	217	223	230	237	244	251	259	266	269	272	274	277	280	283	286	288	291
8	172	177	182	188	194	199	205	211	218	224	231	233	236	238	240	243	245	248	250	253
9	149	154	158	163	168	173	178	183	189	195	200	202	205	207	209	211	213	215	217	219
10	129	133	137	141	146	150	155	159	164	169	174	176	177	179	181	183	185	186	188	190
11	112	116	119	123	126	130	134	138	142	147	151	152	154	155	157	159	160	162	163	165
12	97	100	103	106	110	113	116	120	123	127	131	132	134	135	136	138	139	140	142	143
13	85	87	90	92	95	98	101	104	107	110	114	115	116	117	118	119	121	122	123	124
14	73	76	78	80	83	85	88	90	93	96	99	100	101	102	103	104	105	106	107	108
15	64	66	68	70	72	74	76	78	81	83	86	86	87	88	89	90	91	92	93	94
16	55	57	59	60	62	64	66	68	70	72	74	75	76	76	77	78	79	80	80	81
17	48	49	51	52	54	56	57	59	61	62	64	65	66	66	67	68	68	69	70	70
18	42	43	44	45	47	48	50	51	53	54	56	56	57	58	58	59	59	60	60	61
19	36	37	38	39	41	42	43	44	46	47	48	49	49	50	50	51	51	52	52	53
20	31	32	33	34	35	36	37	38	40	41	42	42	43	43	44	44	45	45	46	46
21	27	28	29	30	31	31	32	33	34	35	36	37	37	38	38	38	39	39	39	40
22	24	24	25	26	26	27	28	29	30	31	32	32	32	33	33	33	34	34	34	35
23	20	21	22	22	23	24	24	25	26	27	27	28	28	28	29	29	29	29	30	30
24	18	18	19	19	20	21	21	22	22	23	24	24	24	25	25	25	25	26	26	26
25	15	16	16	17	17	18	18	19	19	20	21	21	21	21	22	22	22	22	22	23

AGE/TIME	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055
0	344	346	349	351	354	356	359	361	364	366	368	370	372	374	375	377	379	381	383
1	688	693	697	702	707	712	717	722	727	732	736	740	743	747	751	755	758	762	766
2	597	601	605	609	614	618	622	627	631	635	639	642	645	648	651	655	658	661	665
3	518	521	525	529	532	536	540	544	547	551	554	557	560	562	565	568	571	574	577
4	449	452	455	459	462	465	468	472	475	478	481	483	485	488	490	493	495	498	500
5	390	392	395	398	401	404	406	409	412	415	417	419	421	423	425	428	430	432	434
6	338	340	343	345	348	350	353	355	358	360	362	364	365	367	369	371	373	375	377
7	293	295	297	300	302	304	306	308	310	312	314	315	317	319	320	322	323	325	327
8	255	256	258	260	262	264	265	267	269	271	272	274	275	276	278	279	281	282	283
9	221	222	224	225	227	229	230	232	233	235	236	237	239	240	241	242	243	245	246
10	192	193	194	196	197	198	200	201	203	204	205	206	207	208	209	210	211	212	213
11	166	167	169	170	171	172	173	175	176	177	178	179	180	181	181	182	183	184	185
12	144	145	146	147	148	149	150	151	152	154	154	155	156	157	157	158	159	160	161
13	125	126	127	128	129	130	130	131	132	133	134	135	135	136	137	137	138	139	139
14	109	109	110	111	112	112	113	114	115	116	116	117	117	118	118	119	120	120	121
15	94	95	95	96	97	98	98	99	100	100	101	101	102	102	103	103	104	104	105
16	82	82	83	83	84	85	85	86	86	87	87	88	88	89	89	90	90	91	91
17	71	71	72	72	73	73	74	74	75	75	76	76	77	77	77	78	78	79	79
18	62	62	62	63	63	64	64	65	65	65	66	66	66	67	67	67	68	68	68
19	53	54	54	54	55	55	56	56	56	57	57	57	58	58	58	59	59	59	59
20	46	47	47	47	48	48	48	49	49	49	50	50	50	50	51	51	51	51	52
21	40	40	41	41	41	42	42	42	42	43	43	43	43	44	44	44	44	45	45
22	35	35	35	36	36	36	36	37	37	37	37	37	38	38	38	38	38	39	39
23	30	30	31	31	31	31	32	32	32	32	32	33	33	33	33	33	33	34	34
24	26	26	27	27	27	27	27	28	28	28	28	28	28	28	29	29	29	29	29
25	23	23	23	23	23	24	24	24	24	24	24	24	25	25	25	25	25	25	25

Figure 8. Average Baltic Vehicle fleet composition projection.

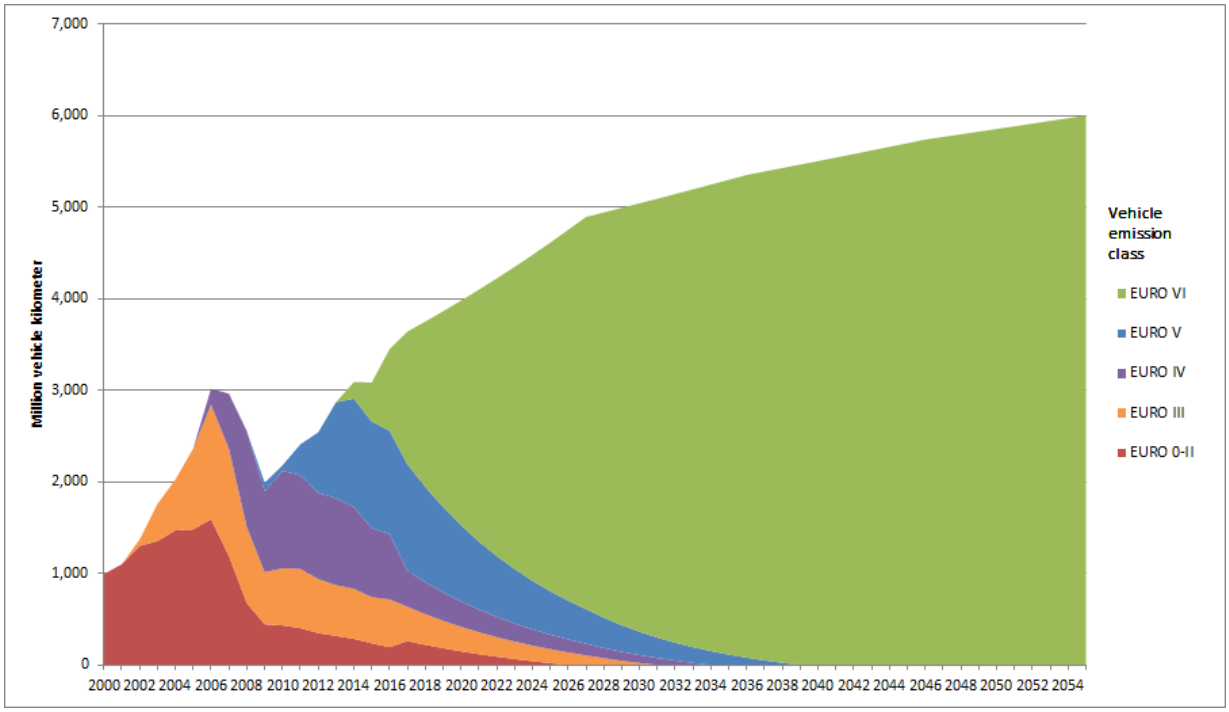


Figure 9. Average Baltic Vehicle fleet composition projection.

An excerpt from Figure 9 concerning the RB CBA period (2026–2055) presented in the form as percentage of the vehicle kilometres driven in each year may be seen in Figure 10. The results are used in the first two columns of the table in Figure 11. The average marginal external air pollution cost for different vehicle classes in the Baltic States is obtained from Appendix 2.

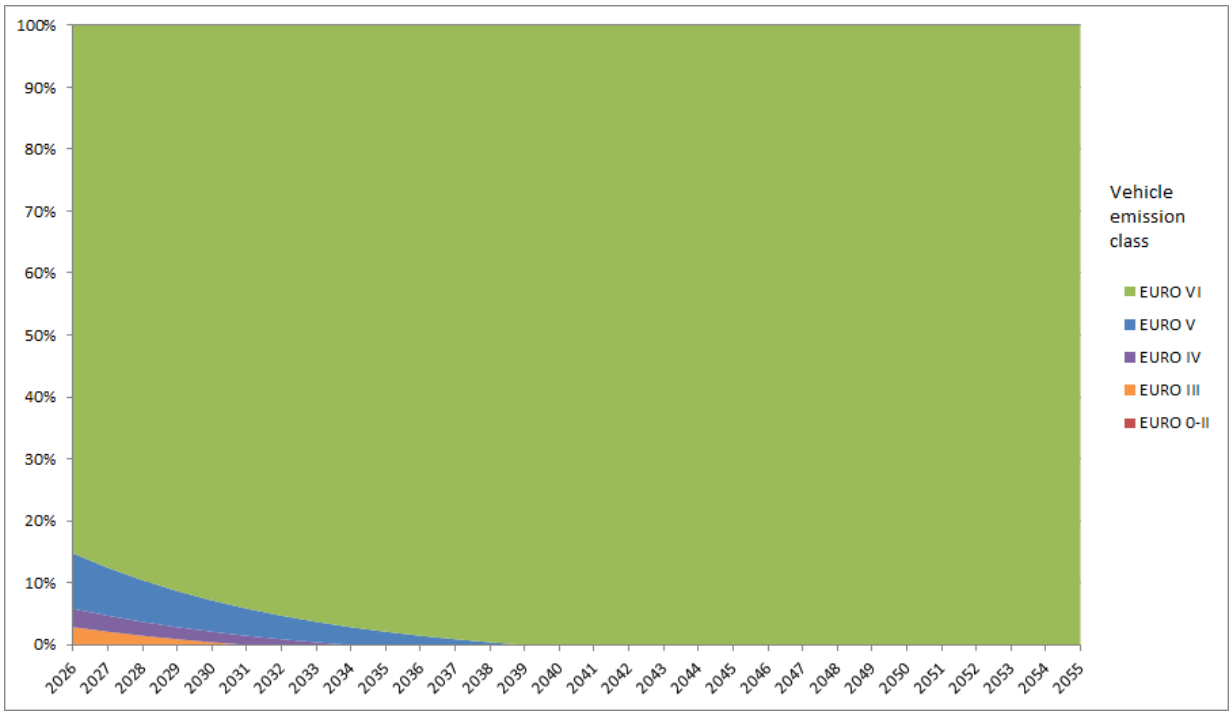


Figure 10. Average Baltic Vehicle fleet composition projection proportion 2026-2055.

	Total vehicle kilometers (million)	Share	Baltic average marginal external air pollution cost (motorway) €ct/vkm
EURO 0-II	0	0.00%	
EURO III	379	0.23%	6.2
EURO IV	707	0.43%	4.2
EURO V	2,682	1.63%	1.7
EURO VI	160,764	97.71%	0.3
Grand total	164,531 million vkm		
Weighted average (€ct/vkm)			**0.35**

Figure 11. Total Baltic vehicle fleet composition projection for 2026–2055.

Appendix 2

Calculation of the average air pollution cost of the HGV in the Rail Baltica region

External costs of air pollution: Road

An excerpt from the Excel annex for Ricardo-AEA et al. (2013) "Update of the Handbook on external costs of transport", European Commission – DG MOVE

Marginal external air pollution costs in €ct/vkm

Region: **Estonia**

Vehicle	Category	EURO-Class	Urban	Suburban	Interurban	Motorway
			€c/vkm	*€c/vkm*	*€c/vkm*	*€c/vkm*
Articulated HGV	14 - 20 t	EURO 0	17.6	9.5	6.3	5.5
		EURO I	11.1	5.8	3.8	3.3
		EURO II	8.4	5.4	3.8	3.4
		EURO III	7.5	4.5	3.0	2.6
		EURO IV	4.1	2.8	2.1	1.8
		EURO V	3.9	2.6	1.3	0.8
		EURO VI	1.3	0.5	0.2	0.2
	20 - 28 t	EURO 0	19.6	11.0	7.1	6.0
		EURO I	15.1	8.0	5.1	4.3
		EURO II	11.3	7.2	5.0	4.3
		EURO III	9.7	6.0	4.0	3.3
		EURO IV	5.1	3.7	2.7	2.3
		EURO V	4.5	3.0	1.5	1.0
		EURO VI	1.4	0.5	0.2	0.2
	28 - 34 t	EURO 0	21.1	11.9	7.7	6.4
		EURO I	16.2	8.7	5.4	4.5
		EURO II	12.2	7.8	5.3	4.5
		EURO III	10.2	6.4	4.3	3.5
		EURO IV	5.4	4.0	2.9	2.4
		EURO V	4.4	2.9	1.5	1.0
		EURO VI	1.4	0.5	0.2	0.2
	34 - 40 t	EURO 0	24.8	14.1	9.0	7.4
		EURO I	19.3	10.3	6.3	5.2
		EURO II	14.4	9.2	6.3	5.2
		EURO III	12.1	7.6	5.1	4.1
		EURO IV	6.2	4.6	3.4	2.8
		EURO V	4.9	3.2	1.7	1.1
		EURO VI	1.4	0.5	0.3	0.2
	40 - 50 t	EURO 0	28.1	16.1	10.4	8.5
		EURO I	21.8	11.7	7.3	5.8
		EURO II	16.3	10.5	7.2	5.8
		EURO III	13.5	8.6	5.8	4.6
		EURO IV	6.9	5.2	3.9	3.1
		EURO V	5.0	3.2	1.8	1.3
		EURO VI	1.4	0.5	0.3	0.3
	50 - 60 t	EURO 0	34.1	19.8	12.9	10.0
		EURO I	26.5	14.4	8.9	7.0
		EURO II	19.7	12.8	8.7	7.0
		EURO III	16.0	10.3	7.0	5.4
		EURO IV	8.2	6.4	4.7	3.7
		EURO V	5.5	3.5	2.0	1.5
		EURO VI	1.5	0.6	0.3	0.3

Marginal external air pollution costs in €ct/vkm

Region: **Latvia**

Vehicle	Category	EURO-Class	Urban	Suburban	Interurban	Motorway
			€c/vkm	*€c/vkm*	*€c/vkm*	*€c/vkm*
Articulated HGV	14 - 20 t	EURO 0	21.5	13.5	9.5	8.3
		EURO I	13.4	8.2	5.7	5.0
		EURO II	10.9	7.8	5.8	5.1
		EURO III	9.5	6.5	4.7	4.0
		EURO IV	5.4	4.2	3.2	2.8
		EURO V	5.1	3.9	2.0	1.2
		EURO VI	1.5	0.7	0.3	0.2
	20 - 28 t	EURO 0	24.2	15.6	10.9	9.1
		EURO I	18.3	11.3	7.7	6.5
		EURO II	14.6	10.6	7.7	6.5
		EURO III	12.4	8.7	6.2	5.1
		EURO IV	6.9	5.5	4.2	3.5
		EURO V	5.9	4.4	2.3	1.5
		EURO VI	1.5	0.7	0.3	0.3
	28 - 34 t	EURO 0	26.1	16.9	11.7	9.7
		EURO I	19.7	12.2	8.2	6.8
		EURO II	15.7	11.3	8.2	6.8
		EURO III	13.1	9.3	6.5	5.3
		EURO IV	7.4	5.9	4.4	3.6
		EURO V	5.7	4.2	2.3	1.5
		EURO VI	1.5	0.7	0.3	0.3
	34 - 40 t	EURO 0	30.8	20.1	13.7	11.2
		EURO I	23.5	14.4	9.6	7.9
		EURO II	18.7	13.5	9.6	7.9
		EURO III	15.5	11.0	7.8	6.3
		EURO IV	8.5	6.9	5.3	4.2
		EURO V	6.4	4.7	2.6	1.7
		EURO VI	1.6	0.7	0.4	0.3
	40 - 50 t	EURO 0	35.1	23.1	15.9	12.9
		EURO I	26.6	16.5	11.1	8.9
		EURO II	21.2	15.4	11.0	8.9
		EURO III	17.4	12.5	8.8	7.1
		EURO IV	9.5	7.8	6.0	4.8
		EURO V	6.4	4.6	2.7	1.9
		EURO VI	1.6	0.7	0.4	0.4
	50 - 60 t	EURO 0	42.7	28.4	19.7	15.3
		EURO I	32.5	20.3	13.6	10.6
		EURO II	25.6	18.7	13.3	10.7
		EURO III	20.7	15.0	10.7	8.3
		EURO IV	11.4	9.6	7.2	5.7
		EURO V	7.1	5.1	3.1	2.2
		EURO VI	1.6	0.8	0.5	0.4

Marginal external air pollution costs in €ct/vkm

Region: **Lithuania**

Vehicle	Category	EURO-Class	Urban	Suburban	Interurban	Motorway
			€c/vkm	*€c/vkm*	*€c/vkm*	*€c/vkm*
Articulated HGV	14 - 20 t	EURO 0	25.0	17.0	12.5	10.9
		EURO I	15.6	10.3	7.5	6.6
		EURO II	13.1	10.1	7.7	6.8
		EURO III	11.3	8.4	6.1	5.3
		EURO IV	6.7	5.4	4.2	3.7
		EURO V	6.3	5.0	2.7	1.6
		EURO VI	1.6	0.8	0.4	0.3
	20 - 28 t	EURO 0	28.4	19.8	14.3	12.0
		EURO I	21.3	14.3	10.1	8.5
		EURO II	17.7	13.6	10.1	8.5
		EURO III	14.8	11.2	8.1	6.7
		EURO IV	8.6	7.1	5.5	4.6
		EURO V	7.2	5.7	3.0	2.0
		EURO VI	1.6	0.8	0.4	0.4
	28 - 34 t	EURO 0	30.7	21.5	15.4	12.8
		EURO I	22.9	15.4	10.8	9.0
		EURO II	19.0	14.6	10.8	9.0
		EURO III	15.8	11.9	8.6	7.0
		EURO IV	9.2	7.7	5.9	4.8
		EURO V	7.0	5.4	3.0	2.0
		EURO VI	1.6	0.8	0.4	0.3
	34 - 40 t	EURO 0	36.3	25.5	18.1	14.7
		EURO I	27.2	18.2	12.7	10.4
		EURO II	22.5	17.4	12.7	10.4
		EURO III	18.6	14.1	10.2	8.3
		EURO IV	10.6	9.0	7.0	5.6
		EURO V	7.8	6.1	3.4	2.3
		EURO VI	1.7	0.8	0.5	0.4
	40 - 50 t	EURO 0	41.4	29.4	20.9	17.0
		EURO I	31.0	20.9	14.6	11.6
		EURO II	25.6	19.8	14.5	11.8
		EURO III	21.0	16.1	11.7	9.3
		EURO IV	11.9	10.2	7.9	6.3
		EURO V	7.8	6.0	3.5	2.5
		EURO VI	1.7	0.8	0.5	0.5
	50 - 60 t	EURO 0	50.5	36.2	25.9	20.1
		EURO I	37.8	25.7	17.8	13.9
		EURO II	31.0	24.1	17.6	14.1
		EURO III	25.0	19.4	14.1	10.9
		EURO IV	14.4	12.6	9.6	7.5
		EURO V	8.5	6.6	4.1	3.0
		EURO VI	1.8	0.9	0.6	0.6

Calculation of the Baltic average marginal external air pollution costs in €ct/vkm

Articulated HGV 34 - 40 t

Estonia

EURO-Class	Urban	Suburban	Interurban	Motorway
EURO 0	24.8	14.1	9.0	7.4
EURO I	19.3	10.3	6.3	5.2
EURO II	14.4	9.2	6.3	5.2
EURO III	12.1	7.6	5.1	4.1
EURO IV	6.2	4.6	3.4	2.8
EURO V	4.9	3.2	1.7	1.1
EURO VI	1.4	0.5	0.3	0.2

Latvia

EURO-Class	Urban	Suburban	Interurban	Motorway
EURO 0	30.8	20.1	13.7	11.2
EURO I	23.5	14.4	9.6	7.9
EURO II	18.7	13.5	9.6	7.9
EURO III	15.5	11.0	7.8	6.3
EURO IV	8.5	6.9	5.3	4.2
EURO V	6.4	4.7	2.6	1.7
EURO VI	1.6	0.7	0.4	0.3

Lithuania

EURO-Class	Urban	Suburban	Interurban	Motorway
EURO 0	36.3	25.5	18.1	14.7
EURO I	27.2	18.2	12.7	10.4
EURO II	22.5	17.4	12.7	10.4
EURO III	18.6	14.1	10.2	8.3
EURO IV	10.6	9.0	7.0	5.6
EURO V	7.8	6.1	3.4	2.3
EURO VI	1.7	0.8	0.5	0.4

Baltic average

EURO-Class	Urban	Suburban	Interurban	Motorway
EURO 0	30.6	19.9	13.6	11.1
EURO I	23.3	14.3	9.5	7.8
EURO II	18.5	13.4	9.5	7.8
EURO III	15.4	10.9	7.7	6.2
EURO IV	8.4	6.8	5.2	4.2
EURO V	6.4	4.7	2.6	1.7
EURO VI	1.6	0.7	0.4	0.3

Appendix 3

Analysis published and presented in the conference "New outcomes of the Rail Baltic analysis" held in a conference room in the building of the Estonian Parliament on 8 June 2017
http://avalikultrailbalticust.ee/PDF/RB%20EY%20errors.pdf

Major mistakes in Rail Baltic CBA made by EY

Priit Humal, Karli Lambot, Illimar Paul, Raul Vibo

Summary introduction

For EU infrastructure projects, discounted revenue (i.e. revenue calculated at the present value) must exceed discounted costs for the project to be feasible. Distinction is made between financial and socio-economic feasibility. It often happens that the project is not directly financially feasible, but it has indirect economic impact when recalculated in terms of socio-economic benefits. Traffic forecasts are used to calculate so-called virtual profit and loss, which are then entered in the same table as the actual financial investments, costs and revenues received from operation.

Ernst & Young (EY) found that the Rail Baltic (RB) project would generate discounted costs of €4.5 billion and discounted revenue of €5.4 billion[73]. This means a difference (net present value or NPV) of €879 million, based on which the project appears to be economically viable. In comparison, the discounted costs of RB according to the calculations made by AECOM 2011 were €1.8 billion and the discounted revenue €3.2 billion[74], the resulting NPV being €1.4 billion.

We do not believe that the freight volumes estimated in the feasibility study are achievable, but let us leave the forecast accuracy aside for now. We concluded that for the forecasted volumes of freight and passenger transport, which are approximately the same as in previous CBA, the socio-economic impact of the future scenario envisaged by EY is positive only due to flawed calculations. The most frequent mistake by EY is picking the wrong assumption from the referenced source. Thus, the calculation of fuel costs and hence the fuel excise is based on the emission class of trucks that are not used for long-distance road transport. The greatest error, however, comes from calculation of truck emissions, where EY based its assessment on the trucks that were manufactured at the end of the previous century, but the impact of pollution of the currently manufactured EURO VI trucks is approximately 25 times smaller; this reduces the positive socio-economic impact of RB project by €3 billion.

Correction of the socio-economic impact of RB project estimated by EY (in € million):

	Undiscounted value	NPV
1. Incorrect percentage of calculated excise duty	-220	-65
2. Increase in excise duty by GDP	-930	-260
3. Truck pollution	-2957	-840
TOTAL	-4107	-1165

Project NPV (€ million) = 879 – 1165 = -268

[73] EY Report, p. 186. *http://railbaltica.org/wp-content/uploads/2017/04/RB_CBA_FINAL_REPORT_0405.pdf*
[74] AECOM: Rail Baltica Final Report. Volume I.
http://www.railbaltica.org/wp-content/uploads/2017/05/AECOM_Final_Report_Volume_I.pdf

After correcting the mistakes, the present value of the project appears to be negative by approximately €300 million and is not eligible for financing by EU rules.

Specific mistakes with their estimated monetary impact are presented below. Since EY has not shown the exact calculation in its Cost-Benefit Analysis, we can only provide an estimated impact on the feasibility. EY should correct the mistakes and publish the corrected results together with detailed calculations.

1. Reduction in the received excise duty on fuel due to RB exceeds the estimation by EY

Transferring of freight from trucks to rail will reduce the fuel excise duty on road transport. For the project operator, it represents a socio-economic impact, because the excise is not received on the account of RB Rail AS. For the owner of RB Rail, the Baltic States, it would mean reduced income from excise duty. This has also been estimated by EY.

EY fails to show the exact calculation, but according to the assumed data sources, the calculation appears to be:

Vehicle operating costs per vehicle-km for trucks: 0.8 €[75]

Heavy truck EBIT margin: 6%
Heavy truck fuel % of OPEX: 25%[76]

0.8 € * 0.94 * 0.25 = 0.19 €

According to that, the fuel consumption of freight carrier is 19 €ct/km

Excise duty received per one vehicle-km (for trucks) is calculated by multiplying the fuel cost and percentage of excise tax:

Excise tax: the average assumed pan-Baltic excise tax is 44.8%[77]

19 €ct/km * 0.448 = 8.4 €ct/ km received excise

Average estimated freight carrier performance for RB is approx. 6 billion ton-km[78]. On average, one truck carries 13.7 tonnes of freight[79]. Based on the freight volume forecast for RB, the vehicles should annually cover 437 million kilometres.

6 billion ton-km / 13.7 tons per vehicle = 437 million vehicle-kilometres

This results in the following calculation for the receipt of excise duty during 30 years:

0.084 € / km * 437 million km / per annum = 36.8 million / per annum

30 years * 36.8 million / per annum = 1,100 million

This is also the number that EY indicated in the table of economic impact.

According to our opinion, EY has made the following calculation mistakes:

[75] EY Report, p. 146. *http://railbaltica.org/wp-content/uploads/2017/04/RB_CBA_FINAL_REPORT_0405.pdf*
[76] *Ibid., p. 147*
[77] *Ibid., p. 147*
[78] *Ibid., p. 152*
[79] *Ibid., p. 143*

The reference table that was used as a source of fuel consumption OPEX 25% provides the percentage of fuel cost for *16–18t rigid* trucks, when the trucks actually used in road freight transport are *38t (2+3) artic* vehicles with the relevant indicator of 30%[80].

When considering 30% instead of 25%, the cost of fuel consumption would be 24 €ct /km, which corresponds to the actual situation today. The difference by five percentage points, i.e. 20%, reduces the undiscounted socio-economic feasibility by €220 million and NPV by €65 million.

2. Correction of the increase in fuel excise according to growth of GDP

The reason for the second major difference is that the data sources for fuel and excise duty originate from 2015 and the values up to 2055 have not been modified. Even at the time when the analysis was published, the excise duty rate in Estonia was higher than what was considered in the analysis. The exact excise duty rate and fuel price or the fuel used by vehicles in the forecasted period is currently unknown. Meanwhile, the calculation of the impact of pollution assumes that the vehicles would use the same fuel and the pollution impact figures have been adjusted in line with GDP growth. It sounds reasonable that the excise tax would increase at the same pace as the estimated increase in the impact of climate change.

The estimated GDP growth has been presented[81] and, pursuant to the Guide to Cost-Benefit Analysis, the calculation of estimated increase includes a coefficient of 0.7 (reduced by 30%). Based on that, the average coefficient for total GDP impact on rail revenue in 2026-2055 is 1.7.

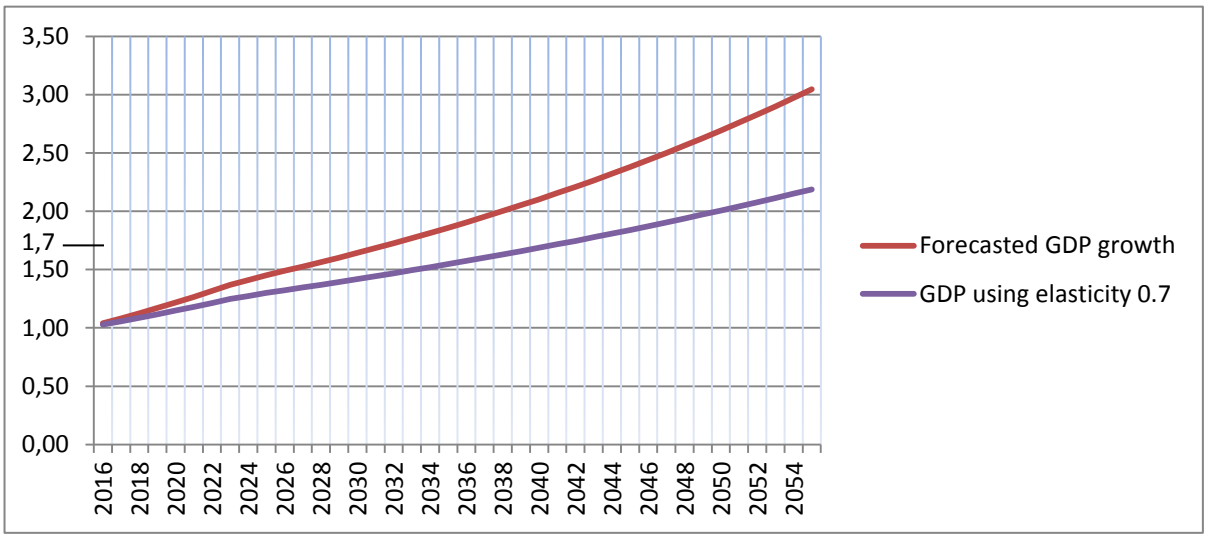


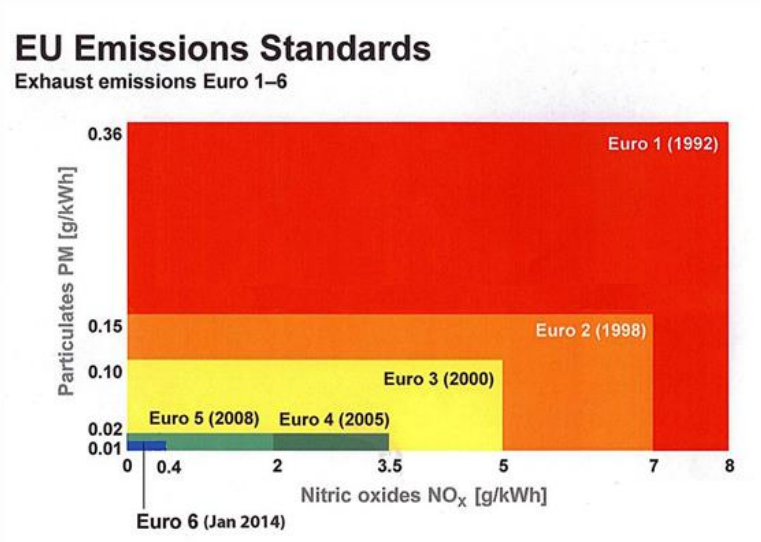
Figure 1. Estimated growth of GDP.

The adjusted reduction in the received excise duty on truck fuel is: €1,098 million * 1.2 * 1.7 = €2,240 million. **Due to the calculations having been made for the wrong truck type, as previously mentioned, the corrected calculated impact of GDP growth is €930 million (€2,240 million – €1,320 million = €930 million) in undiscounted value and NPV is reduced by €260 million.**

[80] Appendix 9
[81] EY Report, p. 292. *http://railbaltica.org/wp-content/uploads/2017/04/RB_CBA_FINAL_REPORT_0405.pdf*

3. Inaccurate calculation of actual impact of truck air pollution

The so called "cleaner air" benefit of the railway consists of two parts. The first, climate change, primarily stands for CO_2 emissions, which is inevitable when fossil fuels are used. The second results in the emission of nitrogen and other toxic products of combustion. The reduction in emission of these toxic compounds constitutes the greatest part of the so-called "cleaner air" component in the CBA. It's the biggest component of the socio-economic impact claimed by EY: reduced air pollution due to transferring of freight from trucks to rail. The total socio-economic impact to RB project would be €3.3 billion in undiscounted value (20% of the socio-economic impact estimated in the EY CBA). In recent years, there has been a significant technological advancement to avoid toxic air emissions.



The EURO VI trucks standard that entered into force in 2014 reduced the nitrogen compound emissions by more than 10 times compared to the EURO III standard used at the turn of the century. It also extended the obligation of vehicle manufacturers to ensure compliance with the requirements during the vehicle's entire engine life. The EU is also implementing road inspection, which will significantly reduce truck pollution in the near future. All of the previously mentioned requirements are also present in the truck pollution figures visible today and they are already several times smaller than those used in the calculations by EY and will be even smaller by the time RB is launched.

Considering that the trucks in our region are, on average, less than 10 years old, approximately 100% of trucks will comply with EURO VI standard or better by the time RB launches its rail traffic[82].

The calculation of pollution cost is based on air pollution assumptions shown on page 146, i.e. 10 cents/km for heavy trucks outside city[83].

[82] *Y. Pang.* rtp_fleet_projection_Base2013_v3.0_final. *http://naei.defra.gov.uk/resources/rtp_fleet_projection_Base2013_v3.0_final.xlsx*
[83] EY Report, p. 146. *http://railbaltica.org/wp-content/uploads/2017/04/RB_CBA_FINAL_REPORT_0405.pdf*

Air pollution assumptions

The following assumptions (in 2015 prices) have been used:[153]

	EUR/vkm							EUR per LTO*
	Intercity bus	City bus	Car	Heavy truck	Diesel freight train	Freight /PAX train	Air	Air
Within city	0.20	0.18	0.02	0.22	3.77	0	0.17	87.86
Outside city	0.09	0.08	0.01	0.10	1.50	0		

*Landing and take-off

It is assumed that these costs would grow together with the forecasted real growth of average pan-Baltic GDP per capita. Based on the CBA methodology[154], a coefficient of 0.7 is applied to these growth rates.

Figure 2. Excerpt from assumptions by EY.

Table[84] contains the air pollution source data referred by EY. The values used are concurrent with EU-RO II trucks. There is no reason to believe that trucks manufactured in the previous century would still be driving around in a couple of decades. The impact of pollution of EURO VI trucks is 0.4 cents/km, which is **25 times** smaller than that considered by EY. It is only 10 times smaller in urban traffic, but long-distance freight has only a small share of urban traffic. When considering 10% urban traffic share, the average difference from the values presented by EY would be 23.5 times.

Vehicle	Category	EURO-Class	Urban €c/vkm	Suburban €c/vkm	Rural €c/vkm	Motorway €c/vkm
Articulated HGV	14 - 20 t	EURO 0	28.5	17.6	12.5	11.0
		EURO I	17.9	10.7	7.5	6.6
		EURO II	14.4	10.3	7.7	6.8
		EURO III	12.6	8.6	6.1	5.3
		EURO IV	7.2	5.5	4.2	3.7
		EURO V	6.8	5.1	2.7	1.6
		EURO VI	2.0	0.9	0.4	0.3
	20 - 28 t	EURO 0	32.2	20.4	14.4	12.0
		EURO I	24.4	14.8	10.2	8.6
		EURO II	19.4	13.8	10.1	8.6
		EURO III	16.4	11.4	8.1	6.7
		EURO IV	9.2	7.2	5.5	4.6
		EURO V	7.8	5.8	3.0	2.0
		EURO VI	2.0	0.9	0.4	0.4
	28 - 34 t	EURO 0	34.7	22.2	15.5	12.8
		EURO I	26.2	16.0	10.9	9.0
		EURO II	20.8	14.9	10.7	9.0
		EURO III	17.4	12.2	8.6	7.0
		EURO IV	9.8	7.8	5.8	4.8
		EURO V	7.6	5.5	3.0	2.0
		EURO VI	2.0	0.9	0.5	0.4
	34 - 40 t	EURO 0	40.9	26.3	18.1	14.8
		EURO I	31.1	18.9	12.7	10.4
		EURO II	24.7	17.7	12.7	10.4
		EURO III	20.5	14.4	10.2	8.3
		EURO IV	11.2	9.0	6.9	5.6
		EURO V	8.5	6.2	3.4	2.3
		EURO VI	2.1	0.9	0.5	0.4
	40 - 50 t	EURO 0	46.5	30.2	21.0	17.1
		EURO I	35.4	21.7	14.7	11.7
		EURO II	28.0	20.1	14.5	11.8
		EURO III	23.0	16.4	11.6	9.3
		EURO IV	12.5	10.3	7.9	6.3
		EURO V	8.5	6.1	3.5	2.5
		EURO VI	2.1	0.9	0.5	0.5
	50 - 60 t	EURO 0	56.6	37.2	25.9	20.2
		EURO I	43.1	26.6	17.9	14.0
		EURO II	33.9	24.5	17.5	14.1
		EURO III	27.4	19.7	14.1	10.9
		EURO IV	15.1	12.6	9.5	7.5
		EURO V	9.4	6.7	4.1	3.0
		EURO VI	2.2	1.0	0.6	0.6

Source: own calculations based on COPERT 4 emission factors. Damage cost factors from Table 15.

Figure 3. Source data referred to in the cost-benefit analysis.

[84] Ricardo-AEA: Update of the Handbook on External Costs of Transport. January 2014, p. 57. *https://ec.europa.eu/transport/sites/transport/files/themes/sustainable/studies/doc/2014-handbook-external-costs-transport.pdf#page=57*

The total air pollution impact will decrease accordingly.

Table 90 Air pollution reduction by source

Air pollution reduction	% of total	Effect, M EUR	Total, M EUR
Bus	0.412%	13.5	3 268
Car	7.092%	231.8	
Existing Train	0.002%	0.1	
Air	3.935%	128.6	
Heavy truck	88.559%	2 894.4	
Rail Baltica	0.000%	0.0	

Figure 4. Excerpt from the EY calculation of air pollution impact[85].

Let us divide the estimate of monetary impact of air pollution shown in the table by our calculated difference of 23.5:

€2,894 million / 23.5 = €123 million

Compared to the EY calculations, the socio-economic impact will decrease by 2,771 million (2,894 million – 123 million = 2,771 million)

The same mistake occurs with regard to passenger cars, where EY has estimated the pollution of 0.01 €/km, while the relevant indicator for EURO VI passenger cars as shown in the table referred to by EY[86] is 0.001-0.002 €/km, depending on the engine type. Thus, the difference is fivefold.

€231.8 million / 5 = €46 million

€232 million – €46 million = €186 million

After correcting the mistake in pollution impact calculations, the socio-economic impact will decrease by €2,957 million (€2,771 million + €186 million = €2,957 million) when undiscounted, and the calculated NPV will decrease by €840 million.

Conclusion

Due to limited time and many undisclosed data sources and calculations, it has been impossible to provide a more detailed critique towards the cost-benefit analysis. Here are only a few aspects that demonstrate the negative impact on the state budget even if the volume of the rail traffic would be at the level estimated in the cost-benefit analysis.

After making the estimated corrections in the EY calculations, the discounted NPV would be negative by approximately €300 million. Thus, the project is not socio-economically viable.

[85] EY Report, p. 188. *http://railbaltica.org/wp-content/uploads/2017/04/RB_CBA_FINAL_REPORT_0405.pdf*
[86] Ricardo-AEA: Update of the Handbook on External Costs of Transport. January 2014, p. 53. *https://ec.europa.eu/transport/sites/transport/files/themes/sustainable/studies/doc/2014-handbook-external-costs-transport.pdf#page=53*

To make the Rail Baltic project viable:

1. The freight forecast should be adjusted and only realistic socio-economic revenues should be included in the CBA.
2. Extensive CAPEX reduction should be implemented. Economically feasible technical alternatives are described in the COWI feasibility study[87]

A new revised CBA auditing should be ordered by an independent body not affiliated with the project promoters.

June 8, 2017

[87] Feasibility Study on Rail Baltica Railways. Final Report. January 2007.
http://ec.europa.eu/regional_policy/sources/docgener/evaluation/railbaltica/report.PDF

Appendix 4

Public objection by Joint Venture RB Rail AS. Published on 8 June 2017

http://www.logistikauudised.ee/uudised/2017/06/08/ey-rail-balticu-tasuvusuuring-valas-oli-tulle

At the conference on Rail Baltic organised today in the Parliament of Estonia, the speakers claimed that the project is not eligible pursuant to the CEF requirements because its socio-economic benefits have been calculated using the wrong assumptions.

RB Rail, a joint venture with the authorisation to implement the Rail Baltica project, highly appreciates the society's contribution to the discussion regarding the project and the construction of a European gauge railway infrastructure that will benefit the society as a whole.

Therefore we would have been glad to hear the thoughts of the speakers at the conference in advance, before they made their unjustified claims about the project in the public. The calculations were not based on the parameters of the EURO II class and there is nothing in the global cost-benefit analysis of Rail Baltica to indicate the use of such parameters.

RB Rail seeks to include top quality international experts in the planning, designing, constructing and upcoming commercialisation of RB. Thus we entrusted EY, a leading global service provider, with the preparation of the cost-benefit analysis of RB in accordance with an agreement entered into between EY and RB Rail. This was preceded by a public tender for finding a service provider. The EY team consisted of experts from Ernst & Young Baltic Ltd with vast experience in studies on regional transport and logistics, and Ernst & Young Global Mobility experts in Hamburg (Germany) and Atkins (Great Britain).

In order for the study to serve as a good management tool for national and international authorities in implementing the RB project, the cost-benefit analysis was prepared in accordance with the terms and conditions agreed on between EY and RB Rail, which in turn complied with the Guide to Cost-Benefit Analysis of Investment Projects issued by the European Commission.

The cost-benefit analysis was approved by external observers, experienced consultants of DG Move and DG Regio in the field of economic aspects of major international transport projects. The evaluation by the external experts also helped to bring the final analysis into conformity with the highest standards of the abovementioned Guide of the European Commission.

Considering the above, RB Rail has no reason to doubt the reliability of the cost-benefit analysis. At the same time, it is important to emphasise that the cost-benefit analysis is only one strategic document out of many documents supporting the decision-making. Several studies and analyses have been and will be conducted during the implementation of the RB project.

Appendix 5

The first official reply, published on 25. September 2017 on the website of RB Rail AS. The authors of the text have not been mentioned. According to the properties of the document, the author is Janis Strautmanis (Manager at Ernst & Young Baltic)

Comments on MTÜ ARB's questions on CBA

How was the CBA process organized?

- Global Project CBA was carried out over a span of one and a half years in accordance not only with the Terms of Reference agreed by key project stakeholders, but also fully in line with the **Guide to Cost-Benefit Analysis of Investment Projects released by the European Commission**. The compliance of the CBA report with these Terms of Reference was consistently monitored by a **Steering Committee** involving key project stakeholders from **all three Baltic states – Rail Baltic Estonia, Eiropas dzelzceļa līnijas, Lietuvos Geležinkeliai, Lithuanian Ministry of Transport and Communication and RB Rail**. In addition, its compliance with the EU CBA Guide was examined by and further improved based on the suggestions of an **experienced external reviewer**. The final report was **thoroughly presented** not only to all key Baltic and European institutional stakeholders, but also made available – in its entirety – and presented to the general public, in line with RB Rail's wider philosophy of promoting transparency and openness to public scrutiny in the project implementation. Additional **public seminars were held in Tallinn and Tartu** to closely engage with both project supporters and critics in a constructive and open fashion.

Answers to questions posed by MTU ARB

What kind of heavy truck type and why this is chosen in the assumptions "Heavy Truck Fuel % of OPEX 25%"?

a. The source referred to in the Rail Baltica Global Project CBA Final report (hereinafter – EY report) page 147 refers to the data that were used as a proxy (the range between 25-30%) that was substantiated during discussions with local industry (as indicated in the section 13.4. of EY report, more than 40 stakeholders have been interviewed) to arrive at relevant benchmark rate for the calculations, considering the local conditions
b. MTU ARB does not provide a justifiable source regarding the need to change the assumptions of the EY report, merely indicating that 24 cents/km is the value which "corresponds to the actual situation today" (no reference provided).

Why in the assumptions is used lower excise tax than actual today in Estonia and why this excise tax is not magnified by GDP growth as it is in the calculations of air pollution external costs

a. Regarding the tax rate: the excise tax rate was chosen in adherence to the general methodology of the Global Project CBA, using a united source (Eurostat) for the date of the reference year for the analysis.
b. Regarding excise tax growth: RB Rail fully supports the position proposed by MTU ARB: "*How much exactly excise and fuel prices are going to be in the future, or what kind of fuel is going to be used,* ***nobody knows***.", which

supports the approach by EY of keeping the variables unchanged in the forecasting period to the extent possible due to the uncertainty in the future. However, RBR cannot find a detailed justification for the assumption suggested by MTU ARB: "*It **makes sense** to assume that excise duty will rise at the same pace as the predicted increase in climate change effects.*" The analysis is done on real terms (page 143 of EY report), and all tax rates used in the analysis have been kept constant in real terms.

What kind of heavy truck type and why this is used in the assumptions for external costs for truck in the motorway 0.1 EUR/vkm and in the city 0.22 EUR/vkm?

a. In line with the EU CBA guide (http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/cba_guide.pdf), the question should be considered from two separate perspectives:

i. *Forecasting approach and reference scenario perspective*. As per the CBA guide (page 26), CBA compares a scenario with-the-project with a counterfactual baseline scenario without-the-project (*Incremental approach*). The incremental approach requires that the counterfactual scenario is defined as what would happen in the absence of the project. In cases of investments aimed at improving an already existing facility, it should include the costs and the revenues/benefits to operate and maintain the service at a level that it is still operable (*Business As Usual (BAU)*) or even small adaptation investments that were programmed to take place anyway (*do-minimum*). The choice between BAU or do-minimum as counterfactual should be made case by case, on the basis of the evidence about the most feasible, and **likely**, situation. If uncertainty exists, the BAU scenario shall be adopted as a rule of thumb. If do-minimum is used as counterfactual, this scenario should be both feasible and credible, and not cause undue and unrealistic additional benefits or costs. According to the EU CBA Guide, in most aspects of the analysis the reference scenario should be neutral and reflect the information that is known up to the point of the preparation of the forecasts. In other words, due to uncertainty of the future, the analysis should, to the extent possible, avoid any bias on results by making assumptions about the expected changes in calculation parameters unless such changes in the future are fully certain or suggested by the methodology. Such principle is observed throughout the preparation of EY report (also referred above in the answer regarding the excise tax rate growth). This means that the indicated "error" needs to be interpreted as a discussion regarding the likelihood of the assumptions materializing in the future.

In other words, the proposal expressed by MTU ARB is biased and if another core forecasting principle would have been applied it would affect the all modes of transport (including rail). Also, the suggested source by MTU ARB does not correspond to the Rail Baltica region and the truck fleet that would be potentially replaced by Rail Baltica.

ii. *Existing emission factor perspective*. According to the EY approach, a combination of average emission factor values that cover all EURO classes have been applied in the analysis to reflect the uncertainty of:

- *exact existing and future parameters of the truck fleet that is used along the Rail Baltica corridor*. For example, according to the forecasts, roughly one third of freight serviced by Rail Baltica shall originate in or travel to the CIS region which follows the EU emission regulations with a considerable delay and possible deviations (even up to 10 years: http://transportpolicy.net/index.php?title=Russia:_Heavy-duty:_Emissions). Also, according to the data by Latvian council of ports, transit and logistics (www.transport.lv), as of 1.05.2017 the share of Euro 0-II class vehicles registered for international freight shipments in Latvia was still above 20%. Similar tendencies are observable in the overall European freight transport fleet (Eurostat data: http://ec.europa.eu/eurostat/statistics-explained/images/c/ca/Share_of_age_categories_in_road_goods_transport%2C_2015_%28%25_in_vehicle-kilometres%29-F4.png) that indicate around 20% share of vehicles over 10 years old in terms of vehicle kilometres, with shares being higher for local fleets in the Baltic States and especially Poland. These factors contradict the indicated assertion by MTU ARB that approximately 100% of trucks will comply with the Euro VI standard.
- *the types of transport units most likely to be displaced by the future Rail Baltica due to modal shift*. Considering that the Euro VI standard vehicles are relatively more advantageous in international freight shipments, as compared to older Euro emission class vehicles, Rail Baltica is more likely to displace particularly such lower Euro emission class vehicles. Lower Euro emission class vehicles are more likely to be outcompeted by the new rail service. Accordingly, the avoided emissions benefit would not be overstated in the EY report, even if cleaner lorries (e.g. EURO V/VI class) are displaced by Rail Baltica at a lower rate.
- *average age of the truck fleet*. For example, MTU ARB ignores the tendencies in the average age statistics in Europe (https://www.eea.europa.eu/data-and-maps/indicators/average-age-of-the-vehicle-fleet/average-age-of-the-vehicle-8) that indicate observable growth of average vehicle age in the commercial vehicle categories. Especially this is noticeable between 2010 and 2014 when the EURO VI standards were introduced, what means that market reacted to the new standard introduction adversely. This

provides another example why the estimation of air pollution benefits cannot be changed out of context by looking solely at one factor.

b. In addition, MTU ARB provides arguments that are biased towards only selected parameters, when methodologically correct approach would be to be study such factors more carefully and as part of complex modelling for all transport modes. For example, MTU ARB argues that "***The EU is also introducing rolling road testing****, which in the near future is going to reduce truck pollution significantly. All this will also impact vehicles' pollution effects, that* ***even today are several times lower*** *than the estimates used in EY's calculations and will have decreased further by the time RB is projected to come into use*." Methodologically, the effect of new technologies would need to be considered for all transport modes, including rail. Also, for the achievement of improvements in truck operations, a series of investments into road infrastructure and lorry fleet need to be accounted in the counterfactual scenario, improving the relative benefits from Rail Baltica.

- **To summarize**, with respect to the primary claim made by MTU ARB that the CBA overestimates the **rate of air pollution of lorries**, calculated by EY **by combining** the relevant rates for all emission classes **to reflect the mixed nature of the current fleet of lorries** in the Baltic states, it is important to emphasize that – given the inherent complexity and uncertainty regarding the possible future development in transport decarbonization – in this and other similar contexts it is **often impossible to make objective assumptions about the future behavior of emission parameters**. With this in mind, the EU CBA Guide prescribes a **cautious and conservative approach**, whereby a neutral reference scenario must be chosen, reflecting the information that is known at the time of forecasting and abstaining from potentially **biased assumptions about the uncertain future**. The approach suggested by MTU ARB, on the other hand, departs from this principle of neutrality by not only **suggesting highly ambitious emission standards for future lorries** (which, theoretically, may as well materialize in the future, but there is no way of objectively judging today with any degree of certainty), but also, perhaps deliberately, failing to acknowledge the potential effects of further decarbonization and environmental innovation, for example, in the fields of **rail traction and power supply**. It is with this seemingly biased and methodologically unscrupulous approach that MTU ARB comes up with the **sensationalist conclusion** that the CBA emission benefits are overstated by around 3 billion euros.

What kind of proportions are used in the calculations for external costs for heavy truck between city and motorway?

a. The analysis has considered HEATCO indications

Appendix 6

Second official reply from RB Rail AS (13 October 2017)

RB Rail AS Eesti filiaal
Reg. No 14168654
Hobujaama tn 4
Tallinn, 10151 Harjumaa
e-mail: info@railbaltica.org
www.railbaltica.org

Tallinn
13 October 2017
Number: 6.4/2017 – 1

MTÜ ARB
Mardi talu, Pirgu
Juuru vald, 79401 Raplamaa

RB Rail AS reply´s to MTÜ ARB.

Dear Priit Humal, Karli Lambot, Ilmar Paul and Raul Vibo,

thank you for your attention and your letters.

First of all, I would like to use this opportunity to introduce myself. I am Aivar Jaeski, a new team member in the Rail Baltica project as a country manager for Estonia and Finland, Estonian branch director. I joined RB Rail with the strong belief on the benefits of this project that it can bring to Estonia. As logistics engineer I am convinced that logistics infrastructure is the bloodstream for the economy. This infrastructure consists of roads, harbors, airports, signal and data lines, and also railways. If we want to live in prosperity we have to invest in infrastructure.

Transparency and openness in the implementation of a project of such a scale is important. Being for 25 years a governmental official, I am sure that our governmental and European officials are doing the best to establish effective and critical oversight on all phases of the Rail Baltica project. Therefore, RB Rail has stressed for many times that we value the true, open and constructive dialogue with stakeholders, including yourselves. Thus, allow us to express our deepest disappointment on your behavior at the meeting on September 18, 2017, initiated and organized as a good gesture by RB Rail, while MTU ARB refused to have a constructive dialogue with the gathered internal and external experts on the Rail Baltica Cost-Benefit Analysis (CBA).

The Rail Baltica project is involving and engaging many different players, including non-government organizations across the Baltics and also in the European Union. Only constructive dialogue among experts from different institutions will assure truthful result.

Nevertheless, please, find below our experts' responses to your questions according your numbering (please note that there are multiple overlaps in your questions):

1. *What kind of heavy truck type and why this is chosen in the assumptions "Heavy Truck Fuel % of OPEX 25%"?*

a. The source referred to in the Rail Baltica Global Project CBA Final report (hereinafter – EY report) page 147 refers to the data that were used as a proxy (the range between 25-30%) that was substantiated during discussions with local industry (as indicated in the section 13.4. of EY report, more than 40 stakeholders have been interviewed) to arrive at relevant benchmark rate for the calculations, considering the local conditions.

b. MTU ARB does not provide a justifiable source regarding the need to change the assumptions of the EY report, merely indicating that 24 cents/km is the value which "corresponds to the actual situation today" (no reference provided).

2. *Why in the assumptions is used lower excise tax than actual today in Estonia and why this excise tax is not magnified by GDP growth as it is in the calculations of air pollution external costs?*

• Regarding the tax rate: the excise tax rate was chosen in adherence to the general methodology of the Global Project CBA, using a united source (Eurostat) for the date of the reference year for the analysis.

• Regarding excise tax growth: RB Rail fully supports the position proposed by MTU ARB: "How much exactly excise and fuel prices are going to be in the future, or what kind of fuel is going to be used, nobody knows.", which supports the approach by EY of keeping the variables unchanged in the forecasting period to the extent possible due to the uncertainty in the future. However, RBR cannot find a detailed justification for the assumption suggested by MTU ARB: "It makes sense to assume that excise duty will rise at the same pace as the predicted increase in climate change effects." The analysis is done on real terms (page 143 of EY report), and all tax rates used in the analysis have been kept constant in real terms.

3. What kind of heavy truck type and why this is used in the assumptions for external costs for truck in the motorway 0.1 EUR/vkm and in the city 0.22 EUR/vkm?

a. In line with the EU CBA guide (http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/cba_guide.pdf), the question should be considered from two separate perspectives:

i. Forecasting approach and reference scenario perspective. As per the CBA guide (page 26), CBA compares a scenario with-the project with a counterfactual baseline scenario without-the-project (Incremental approach). The incremental approach requires that the counterfactual scenario is defined as what would happen in the absence of the project. In cases of investments aimed at improving an already existing facility, it should include the costs and the revenues/benefits to operate and maintain the service at a level that it is still operable (Business As Usual (BAU)) or even small adaptation investments that were programmed to take place anyway (do-minimum). The choice between BAU or do-minimum as counterfactual should be made case by case, on the basis of the evidence about the most feasible, and likely, situation. If uncertainty exists, the BAU scenario shall be adopted as a rule of thumb. If dominium is used as counterfactual, this scenario should be both feasible and credible, and not cause undue and unrealistic additional benefits or costs. According to the EU CBA Guide, in most aspects of the analysis the reference scenario should be neutral and reflect the information that is known up to the point of the preparation of the forecasts. In other words, due to uncertainty of the future, the analysis should, to the extent possible, avoid any bias on results by making

assumptions about the expected changes in calculation parameters unless such changes in the future are fully certain or suggested by the methodology. Such principle is observed throughout the preparation of EY report (also referred above in the answer regarding the excise tax rate growth). This means that the indicated "error" needs to be interpreted as a discussion regarding the likelihood of the assumptions materializing in the future.

In other words, the proposal expressed by MTU ARB is biased and if another core forecasting principle would have been applied it would affect the all modes of transport (including rail). Also, the suggested source by MTU ARB does not correspond to the Rail Baltica region and the truck fleet that would be potentially replaced by Rail Baltica.

ii. Existing emission factor perspective. According to the EY approach, a combination of average emission factor values that cover all EURO classes have been applied in the analysis to reflect the uncertainty of:

• exact existing and future parameters of the truck fleet that is used along the Rail Baltica corridor. For example, according to the forecasts, roughly one third of freight serviced by Rail Baltica shall originate in or travel to the CIS region which follows the EU emission regulations with a considerable delay and possible deviations (even up to 10 years: http://transportpolicy.net/index.php?title=Russia:_Heavyduty:_Emissions).

Also, according to the data by Latvian council of ports, transit and logistics (www.transport.lv), as of 1.05.2017 the share of Euro 0-II class vehicles registered for international freight shipments in Latvia was still above 20%.

Similar tendencies are observable in the overall European freight transport fleet (Eurostat data: http://ec.europa.eu/eurostat/statisticsexplained/images/c/ca/Share_of_age_categories_in_road_goods_transport%2C_2015_%28%25_in_vehiclekilometres%29-F4.png) that indicate around 20% share of vehicles over 10 years old in terms of vehicle kilometers, with shares being higher for local fleets in the Baltic States and especially Poland. These factors contradict the indicated assertion by MTU ARB that approximately 100% of trucks will comply with the Euro VI standard.

• the types of transport units most likely to be displaced by the future Rail Baltica due to modal shift. Considering that the Euro VI standard vehicles are relatively more advantageous in international freight shipments, as compared to older Euro emission class vehicles, Rail Baltica is more likely to displace particularly such lower Euro emission class vehicles. Lower Euro emission class vehicles are more likely to be outcompeted by the new rail service. Accordingly, the avoided emissions benefit would not be overstated in the EY report, even if cleaner lorries (e.g. EURO V/VI class) are displaced by Rail Baltica at a lower rate.

• average age of the truck fleet. For example, MTU ARB ignores the tendencies in the average age statistics in Europe

(https://www.eea.europa.eu/data-andmaps/indicators/average-age-of-the-vehicle-fleet/averageage-of-the-vehicle-8) that indicate observable growth of average vehicle age in the commercial vehicle categories. Especially this is noticeable between 2010 and 2014 when the EURO VI standards were introduced, what means that market reacted to the new standard introduction adversely. This provides another example why the estimation of air pollution benefits cannot be changed out of context by looking solely at one factor.

b. In addition, MTU ARB provides arguments that are biased towards only selected parameters, when methodologically correct approach would be to be study such factors more carefully and as part of complex modelling for all transport modes. For example, MTU ARB argues that "The EU is also introducing rolling road testing, which in the near future is going to reduce truck pollution significantly. All this will also impact vehicles' pollution effects, that even today are several times lower than the estimates used in EY's calculations and will have decreased further by the time RB is projected to come into use." Methodologically, the effect of new technologies would need to be considered for all transport modes, including rail. Also, for the achievement of improvements in truck operations, a series of investments into road infrastructure and lorry fleet need to be accounted in the counterfactual scenario, improving the relative benefits from Rail Baltica.

To summarize, with respect to the primary claim made by MTU ARB that the CBA overestimates the rate of air pollution of lorries, calculated by EY by combining the relevant rates for all emission classes to reflect the mixed nature of the current fleet of lorries in the Baltic states, it is important to emphasize that – given the inherent complexity and uncertainty regarding the possible future development in transport decarbonization – in this and other similar contexts it is often impossible to make objective assumptions about the future behavior of emission parameters. With this in mind, the EU CBA Guide prescribes a cautious and conservative approach, whereby a neutral reference scenario must be chosen, reflecting the information that is known at the time of forecasting and abstaining from potentially biased assumptions about the uncertain future. The approach suggested by MTU ARB, on the other hand, departs from this principle of neutrality by not only suggesting highly ambitious emission standards for future lorries (which, theoretically, may as well materialize in the future, but there is no way of objectively judging today with any degree of certainty), but also, perhaps deliberately, failing to acknowledge the potential effects of further decarbonization and environmental innovation, for example, in the fields of rail traction and power supply. It is with this seemingly biased and methodologically unscrupulous approach that MTU ARB comes up with the sensationalist conclusion that the CBA emission benefits are overstated by around 3 billion euros.

4. *What proportion of "Outside city" and "Within city" is used in the calculations of total air pollution costs caused by trucks?*

The analysis has considered HEATCO indications. See also answer to previous question No 3.

5. The CBA does not consider railway construction time environmental costs, permanent environmental costs, neither electricity production emissions that are required to run the electric locomotives. Please explain how this is in line with the EU CBA guidelines.

In line with CBA methodology , financial construction costs and operating costs have been converted into economic CAPEX and OPEX values that consider such factors, e.g., fuel used in construction has excise tax element that represents the negative environmental externalities.

Assumption that railway construction and electricity production have consequences involving financial cost is correct. Same time you have to keep in mind that during the rise of traffic intensity on the roads you have to consider also investments to road infrastructure. Alternative to Rail Baltica would be investments to Via Baltica, enlarging road to 4 lines highway, that also brings additional similar construction and environmental costs. Such expenses will not happen only when status quo is kept and investments to road infrastructure will be avoided. In reality the fact that transport of goods through Via Baltica (look details at Estonian Road Administration web page www.mnt.ee) is growing, there is no reason to assume that investments to road construction is avoidable. Taking account that environmentally more friendly railway transport development has priority in Estonia as well in Baltics and EU as whole it is hard to believe that road transport development will get advantage in front of better alternatives.

6. Have you submitted CBA to DG Move or DG Regio?

The final report was thoroughly presented not only to all key Baltic and European institutional stakeholders, for example, DG MOVE, INEA but it was also made available – in its entirety – and presented to the general public, in line with RB Rail's wider philosophy of promoting transparency and openness to public scrutiny in the project implementation. Additional public seminars were held in Tallinn and Tartu to closely engage with both project supporters and critics in a constructive and open fashion. DG Move feedback assures that the analysis are fully in line with the Commission's guidelines for CBAs study's.

Therefore, we urge you to stop spreading false claims and misinterpretations regarding the role and position of the European Commission services regarding the Rail Baltica Global Project CBA.

7. Please advice the names and titles of experts who have approved the CBA as stipulated in your reply 08.07.2017?

Global Project CBA was carried out over a span of one and a half years in accordance not only with the Terms of Reference agreed by key project stakeholders, but also fully in line with the Guide to Cost-Benefit Analysis of Investment Projects released by the European Commission. The compliance of the CBA report with these Terms of Reference was consistently monitored by a Steering Committee involving key project stakeholders from all three Baltic states – Rail Baltic Estonia , Eiropas dzelzceļa līnijas, Lietuvos Geležinkeliai, Lithuanian Ministry of Transport and Communication and RB Rail. From Estonian side also Ministry of Economics and Communications as well Finance Ministry internal and external experts were involved. In addition, its compliance with the EU CBA Guide was examined by and further improved based on the suggestions of an experienced external reviewer.

The CBA was subsequently approved by the RB Rail Management Board and, thereafter, and positively noted by the RB Rail Supervisory Board.

8. *Has CBA got approval from EY internal quality checking? If so please provide the copy of the certificates. The report is lacking the QA/QC information.*

By tendering any study, RB Rail AS expects that any contractor has comprehensive internal quality systems in place and professional approach is used for delivering trustful results. Regarding EY internal quality procedures, please kindly contact EY.

9. Largest issue concerns the truck air pollution rate in motorways (10 EUR per/km) that is used in the calculations of socio-economic benefit. The total undiscounted value obtained from this

assumption is 3,3 billion EURO, about 20% of total socio-economic impact. According the reference source, such an air pollution rate corresponds to EURO I or EURO II trucks. During time 2026-2055, it would be reasonable to expect EURO VI or better trucks to be used. The emission rate for these trucks is 25 times lower, as shown in reference source (0,4 EUR per/km). This correction results in a 3 billion EURO reduction of the social-economic benefits.

Same as question No. 3. See our response to answer No 3.

10. The correction of the long -haul road transportation vehicle type reduces the undiscounted socio-economic benefits by 220 million EUROs.

See the response to question No 3.

11. The correction of predicted fuel exercise growth decreases the undiscounted socio-economic benefit by 930 million EUROs addition?

See the response to question No 2

12. We notice that direct GHG emissions and other environmental impacts caused by the construction process and the new railway corridor have not been considered in the socio-economic impact calculations thus presenting the project more favorable than it actually is.

See the response to question No 5.

13. The cost savings of the rail freight on page 179 (table 77) and on page 75 (table 26) of the CBA shows example calculations of terminal to terminal rail freight costs, comparing them with door to door road freight costs. This fails to consider the costs it takes to ship freight from a customer's door to the railway terminal and from the destination railway terminal to the customer's door. Failure to account for door to terminal and terminal to door costs of rail transport overestimates the benefits i.e. cost savings of the rail freight and expected operator fees.

The cost savings are calculated considering relevant comparable distances (between major freight terminals). The so-called „last mile" deliveries from a customer's door to the railway terminal and from the destination railway terminal to the customer's door are assumed to be done by truck, so no savings accounted for this section in the CBA. The information in the tables represents selected examples to demonstrate the circumstances how Rail Baltica is expected to be competitive.

Last but not least, let us summarize that being an EU co-financed project, its CBA was prepared in strict adherence to the principles and methodology stated in the EU CBA Guide. Best practice application of this guide prescribes a cautious and conservative approach, whereby a neutral reference scenario must always be chosen, reflecting the information that is known at the time of forecasting and abstaining from potentially biased assumptions in the presence of a high degree of uncertainty about the future. EY has consistently followed this principle throughout the CBA, including for the calculation of the emissions generated by road trucks.

Rail Baltica is a project of a century, made to benefit potentially all people of the world. It's a project by the people for the people. Lot of experts and specialists with hundreds of years consolidated experience in the corresponsive fields are participating and engaged in preparation of Rail Baltica project in a best possible way. We are thankful for the attention and energy by civil society organizations who are willing to help the project come true in the best possible way and we know

that at least some members of MTÜ ARB have previously expressed that they are not against Rail Baltica connection. We also find it would be absolutely good and necessary for the transparency and in the public interest to map the motivation and interests of involved organizations. It would also be good for the RB project to be all times aware of those very specific competences on the respected field that would benefit the project in the larger scale - good and competent people are always welcome to help to the success of the project. Therefore, we would kindly ask you to answer few questions of our own:

1. How many large-scale infrastructure projects has your organization analyzed and benchmarked when preparing your view on the Rail Baltica Global Project CBA?

2. Who are the experts and which organizations they represent that are valid and are qualified in the context of Cost-Benefit Analysis?

3. Which independent reputable institution in the field of transport economics has verified and endorsed your findings?

4. What is your professional experience and expertise in regard to the EU CBA methodology?

With regards,

Aivar Jaeski

RB Rail AS EST branch director

References:

[1] http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/cba_guide.pdf

[2] http://transportpolicy.net/index.php?title=Russia:_Heavyduty:_Emissions

[3] www.transport.lv

[4]http://ec.europa.eu/eurostat/statisticsexplained/images/c/ca/Share_of_age_categories_in_road_goods_transport%2C_2015_%28%25_in_vehiclekilometres%29-F4.png

[5] http://www.acea.be/statistics/tag/category/average-vehicle-age

[6]https://www.eea.europa.eu/data-andmaps/indicators/average-age-of-the-vehicle-fleet/averageage-of-the-vehicle-8.

Appendix 7

Official reply to the letter sent to Henrik Hololei, the European Commission's Director-General for Mobility and Transport

EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR MOBILITY AND TRANSPORT

Directorate B - Investment, Innovative & Sustainable Transport
The Director

Brussels, 17 OCT. 2017
MOVE/B/HR/VK/ac(2017)5609474

Mr Priit Humal
Mardi talu, Pirgu küla, Juuru vald
EE - 79401 Raplamaa

Email: toimkond@avalikulrailbalticust.ee

Subject: Your letter of 19 September 2017

Dear Mr Humal,

Thank you for your letter of 19 September 2017.

The updated CBA is an important component of the Rail Baltica project, confirming that the benefits of the project exceed the costs of the investment: 16.2 billion EUR of net socio-economic benefits in contrast to a total CAPEX of 5.8 billion EUR. Let me also recall that the CBA projects the modal shift of trucks from road to rail at 30-40%, and the CO2 emissions and air pollution reduction benefits are expected to exceed 6 billion EUR over the period up to 2055. Modal shift would also enhance road safety: 400 lives could be saved over the period 2026-2055, thanks to Rail Baltica.

The updated CBA performed by Ernst&Young Baltic Ltd was presented publicly at the Rail Baltica Global Forum in Riga in April 2017 and to the best of my knowledge, RB RAIL as well as the contractor have made very clear that they are fully open to a constructive exchange of views with all stakeholders. The full report is publicly accessible[1], and was presented also to interested parties in Estonia.

The analysis used was fully in line with the Commission's guidelines for such CBAs and was reviewed by independent experts. I would also like to reassure you that neither of the experts is a DG MOVE official.

Finally, let me state very clearly that DG MOVE has no reason to doubt the methodological soundness of the analysis, which – once again – was conducted fully in line with Commission guidelines. In any case, it would be for the authors of the CBA to discuss the technical issues referred to in the annex of your letter but I also understand that RB Rail has published on its website replies to the technical questions raised in your letter.

I trust this answers your questions satisfactorily.

Yours sincerely,

Herald RUIJTERS

[1] http://www.railbaltica.org/wp-content/uploads/2017/04/RB_CBA_FINAL_REPORT_0405.pdf

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Appendix 8

Reply of the Innovation and Networks Executive Agency of the DG Move (19 October 2017)

Innovation and Networks Executive Agency
The Director

Brussels,
INEA/BO/cm

BY E-MAIL ONLY

Mr Priit Humal
MTU ARB
Mardi talu, Pirgu kula, Juuru vald
79401 Raplamaa
ESTONIA

priit@humal.ee;

toimkond@avalikultrailbalticust.ee

Subject: **Rail Baltica CBA**

Reference: **Your email of 19/07/2017, registered at INEA (our ref. ARES(2017)3641032, ARES(2017)3738700)**

Dear Mr Humal,

First of all I am sorry about the delay in our reply due to a workload peak. I took note of the additional points raised in your second email regarding the CBA of Rail Baltica. In this respect, I believe that the meeting you had on 22/09/2017 in Tallinn during the Connecting Europe Conference with the INEA representatives was constructive and clarified INEA's position regarding the questions you raised.

As explained in Tallinn, as a general rule it is not INEA's role to discuss technical issues related to an Action receiving financial support under the CEF Programme, such as those listed in your letter. Clarification on such matters is to be requested from the Beneficiaries/Coordinator of CEF funded Actions, who are responsible for their implementation.

INEA is monitoring the implementation of Actions receiving financial support from the CEF Programme and verifying that they are implemented in accordance with the grant agreement. On this basis the grant will be disbursed to the beneficiaries. The CBA report

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is publicly available and we have noted that answers to your questions concerning the CBA are published on the Rail Baltica website of RB Rail AS.

Due to applicable EU legislation INEA is not in a position to disclose information or personal data of neither internal nor external persons, as disclosure would undermine the privacy and the integrity of the individuals. However, INEA publishes once a year the list of all external experts used.

Finally, I would like to clarify that INEA does not assist beneficiaries in the technical implementation of the activities included in their Actions.

Yours sincerely,

(e-signed)
Dirk Beckers

Copies:

Karli Lambot, MTU ARB (karli@ace.ee); Illimar Paul, MTU ARB (illimar.paul@gmail.com); Raul Vibo, MTU ARB (raul.vibo@eesti.ee)

Arturs Caune, RB Rail AS (arturs.caune@railbaltica.org)

Appendix 9

Freight Transport Association. October 2016. England, the United Kingdom
(retrieved on 7 October 2017)
http://www.fta.co.uk/policy_and_compliance/fuel_prices_and_economy/fuel_prices/fuel_fractions.html

Freight Transport Association
Be Connected • Be Compliant • Be Confident

Fuel as a percentage of hgv operating costs

FTA's 'fuel fractions' table shows fuel costs as a proportion of total annual vehicle operating costs* for a range of hgvs.

	Low mileage (miles p.a.)	Fuel costs as a percentage of total cost of vehicle and driver	Average mileage (miles p.a.)	Fuel costs as a percentage of total cost of vehicle and driver	High mileage (miles p.a.)	Fuel costs as a percentage of total cost of vehicle and driver
7.5t rigid	30,000	17	40,000	18	50,000	18
10 - 12t rigid	42,500	22	50,000	22	60,000	22
12 - 14t rigid	35,000	20	40,000	19	50,000	19
16 - 18t rigid	50,000	26	60,000	25	70,000	25
26t rigid	50,000	27	60,000	26	70,000	25
32t rigid	50,000	29	55,000	27	65,000	27
33t (2+2) artic	60,000	30	75,000	30	85,000	29
38t (2+3) artic	65,000	30	75,000	30	85,000	30
38t (3+2) artic	50,000	28	70,000	29	85,000	30
32.5t drawbar	45,000	25	60,000	27	80,000	28
40t (2+3) artic	50,000	27	70,000	29	80,000	29
44t (3+3) artic	70,000	32	85,000	31	100,000	31

* Includes vehicle standing costs, vehicle running costs and driver costs.
Fuel prices based on bulk prices and exclude VAT.
Cost data as at 1 October 2016. Source: FTA's Manager's Guide to Distribution Costs - October 2016 Update Report.

Appendix 10

Europe's Energy. The Netherlands: Portal BCN B.V (retrieved on 28 October 2017)

https://www.energy.eu/fuelprices/

Fuel Prices

Actual prices per one litre of transportation fuel

	Unleaded (Superbleifrei, Euro sans plomb, Euro95)				Diesel (Gazole, Gasóleo)			
Country	Retail Price		Price (Excluding VAT)		Retail Price		Price (Excluding VAT)	
Austria	€ 1.168		€ 0.973		€ 1.068		€ 0.890	
Belgium	€ 1.378		€ 1.139		€ 1.354		€ 1.119	
Bulgaria	€ 1.029	2.03 лв.	€ 0.858	1.69 лв.	€ 1.024	2.02 лв.	€ 0.853	1.68 лв.
Croatia	€ 1.232	9.290 kn	€ 0.986	7.43 kn	€ 1.177	8.88 kn	€ 0.942	7.10 kn
Cyprus	€ 1.169		€ 0.982		€ 1.172		€ 0.985	
Czech Republic	€ 1.109	28.50 Kč	€ 0.917	23.55 Kč	€ 1.078	27.70 Kč	€ 0.891	22.89 Kč
Denmark	€ 1.542	11.49 kr	€ 1.234	9.19 kr	€ 1.354	10.09 kr	€ 1.083	8.07 kr
Estonia	€ 1.134		€ 0.945		€ 1.144		€ 0.953	
Finland	€ 1.407		€ 1.135		€ 1.255		€ 1.012	
France	€ 1.353		€ 1.128		€ 1.240		€ 1.033	
Germany	€ 1.346		€ 1.131		€ 1.160		€ 0.975	
Greece	€ 1.538		€ 1.250		€ 1.289		€ 1.048	
Hungary	€ 1.116	348 Ft	€ 0.879	274 Ft	€ 1.146	358 Ft	€ 0.902	282 Ft
Ireland	€ 1.359		€ 1.105		€ 1.219		€ 0.991	
Italy	€ 1.561		€ 1.280		€ 1.417		€ 1.161	
Latvia	€ 1.127		€ 0.931		€ 0.975		€ 0.806	
Lithuania	€ 1.095		€ 0.905		€ 0.965		€ 0.798	
Luxembourg	€ 1.140		€ 0.974		€ 1.018		€ 0.870	
Malta	€ 1.310		€ 1.110		€ 1.180		€ 1.000	
Netherlands	€ 1.634		€ 1.350		€ 1.329		€ 1.098	
Poland	€ 1.043	4.43 zł	€ 0.848	3.60 zł	€ 1.010	4.29 zł	€ 0.821	3.49 zł
Portugal	€ 1.504		€ 1.223		€ 1.314		€ 1.068	
Romania	€ 1.082	4.99 lei	€ 0.902	4.16 lei	€ 1.095	5.05 lei	€ 0.913	4.21 lei
Slovakia	€ 1.165		€ 0.971		€ 1.000		€ 0.833	
Slovenia	€ 1.264		€ 1.036		€ 1.221		€ 1.001	
Spain	€ 1.199		€ 0.991		€ 1.122		€ 0.927	
Sweden	€ 1.364	13.19 kr	€ 1.091	10.55 kr	€ 1.342	12.98 kr	€ 1.074	10.38 kr
United Kingdom	€ 1.316	£ 1.174	€ 1.097	£ 0.978	€ 1.334	£ 1.190	€ 1.112	£ 0.992
EU AVERAGE	**€ 1.265**		**€ 1.049**		**€ 1.167**		**€ 0.970**	

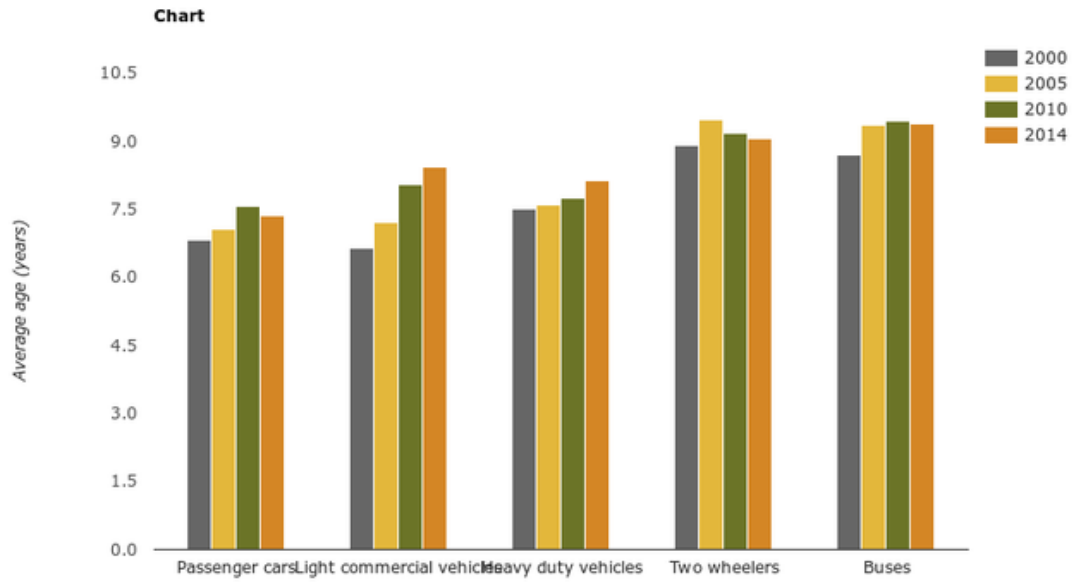
Appendix 11

Average age of the vehicle fleet. 2016. Belgium: European Environment Agency

https://www.eea.europa.eu/data-and-maps/indicators/average-age-of-the-vehicle-fleet/average-age-of-the-vehicle-8

Average age of the vehicle fleet

NOTE: THIS CONTENT HAS BEEN ARCHIVED. THIS INDICATOR IS CURRENTLY BEING REVIEWED.



European Environment Agency

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Contents

Average age of the vehicle fleet

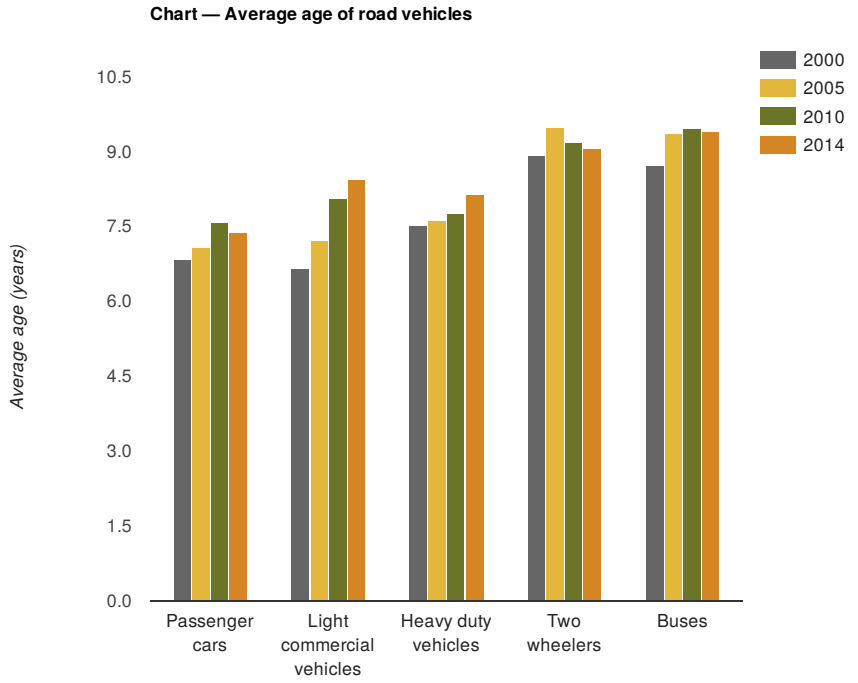
Key messages

NOTE: THIS CONTENT HAS BEEN ARCHIVED. THIS INDICATOR IS CURRENTLY BEING REVIEWED.

- The average age of road vehicles in Europe has increased since 2000.
- In 2014, the average age of passenger cars was 7.4 years, 8 % older than that of the average fleet in 2000. For other vehicle types, the average age was 8.4 years for vans, 8.1 years for heavy duty vehicles, 9.1 years for two-wheelers, and 9.4 years for buses.

Does vehicle fleet replacement result in a reduction in average vehicle age?

Fig. 1: Average age of road vehicles



Explore chart interactively

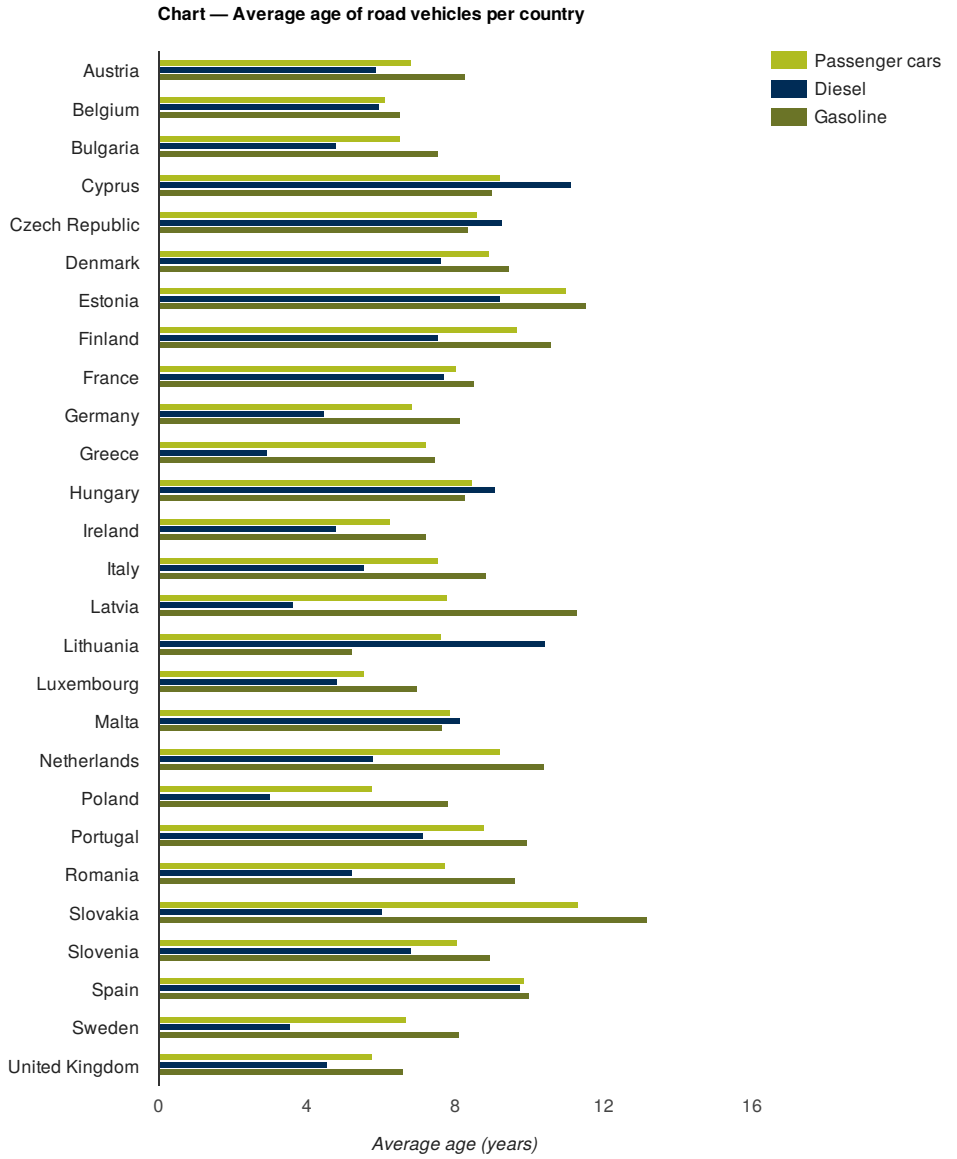
European Environment Agency

Data sources:

- European Consortium for Modelling of Air Pollution and Climate Strategies provided by **European Commission**

6 Average age of the vehicle fleet

Fig. 2: Average age of road vehicles per country



Explore chart interactively

European Environment Agency

Data sources:

- European Consortium for Modelling of Air Pollution and Climate Strategies provided by **European Commission**

- The average age of Europe's passenger cars reached a maximum in 2009, although by 2014 it had decreased slightly to an average age of 7.4 years. This is nevertheless 8 % higher than the figure for 2000, when the average age was 6.8 years. The share of cars aged 10 years or over is generally increasing

across Europe's fleet, as consumers are tending to hold on to their vehicles longer than ever before.

- The average age of passenger cars in the EU-27 (data for Croatia are not available) varies widely among different countries. In 2014, the lowest average age was observed in Luxemburg (5.5 years), and the highest in Slovakia (11.3 years). In general, diesel passenger cars have a lower average age compared to petrol. This is due to the growth of the diesel car market over recent years, i.e. more new diesel vehicles are registered in Europe each year than petrol vehicles (see also TERM 32 indicator on dieselisation).
- In general, older vehicles are used less compared to new ones i.e. they have a lower annual mileage. Hence, from an environmental perspective, the performance of the vehicle fleet can be considered somewhat better than the average age suggests.
- The average age of light commercial and heavy-duty vehicles increased between 2000 and 2014, going from 6.6 and 7.5 years respectively to 8.4 and 8.1 years. The age of two-wheel vehicles increased from 8.9 to 9 years over the same period, reaching its peak in 2004, with an average age of 9.5 years. The average age of buses has also increased, from an average of 8.7 years in 2000 to 9.4 years in 2014.

Indicator specification and metadata

Indicator definition

This indicator is defined as the mean age of vehicles specified by the following vehicle categories: passenger cars, light duty vehicles, heavy duty vehicles, buses, coaches, mopeds and motorcycles.

Units

Average age is expressed in years.

Rationale

Justification for indicator selection

Increasingly tight regulations have resulted in the gradual introduction of more fuel-efficient, less polluting, less noisy and generally safer road vehicles. The average age of the vehicle fleet is therefore an indirect indication of the environmental performance of road transport. For this specific indicator, the overall objective is to record the improvement of the fleet composition in terms of age, whereby older, more polluting vehicles are replaced with newer, cleaner ones. The adoption of car scrappage schemes, import bans on certain vehicles, financial incentives, and mandatory periodical inspection and maintenance schemes could help to decrease the average age of vehicles.

Scientific references

- No rationale references available

Policy context and targets

Context description

Car scrappage schemes have not yet been introduced at EU level. The European Parliament and Council have issued Directive 2000/53/EC on end-of-life vehicles (ELV Directive), which states the need for harmonising the various measures adopted at country level on the treatment of end-of-life vehicles. In addition, the ELV Directive stresses the need for adopting a Community-wide framework for this purpose, but does not include any specific car scrappage schemes. The ELV Directive, as amended by Directive 2008/53/EC and other Commission Decisions, requires that Member States set up systems to ensure ELVs are treated within authorised treatment facilities, sets progressively higher reuse, recycling and recovery targets and an ultimate recovery target of 95 % by weight by 2015, encourages manufactures to design their vehicles with recyclability in mind, and restricts the use of heavy metals in the manufacture of new vehicles.

The environmental performance of vehicles has improved considerably over recent decades as a result of increasingly tighter emissions regulations in Europe. Hence, a quick replacement of older cars with new ones, results in an overall improvement of the environmental performance of the vehicle fleet, presuming activity is constant. Automotive emissions have been regulated in Europe since 1970 with the implementation of the parent European Council Directive 70/220/EEC. This Directive was the result of an intensive period of consultation between member countries of the European Economic Commission (EEC) at that time. At the beginning of the 1970s, the United Nations Economic Committee for Europe (UNECE) established Regulation 15, which, together with its various amendments, delivered the first coherent automotive emissions control policy in Europe for vehicles

of less than 3.5 tonnes in mass.

Since the 1970s, the key mechanism by which vehicle air pollutant emissions have been regulated has been through the setting of exhaust emissions limits. As with CO2 measurements, vehicle conformance with the required limits is checked on the basis of standardised laboratory emissions measurements. The first European Council Directive to specify measures against air pollution from motor vehicles was published in 1970 (EU, 1970). Around 20 years later — in 1992 — the 'Euro' emissions standards were introduced, starting with the 'Euro 1' step, followed, generally, by successively stricter standards: Euro 2 to Euro 6. At present, in 2016, only Euro 6 vehicles can be sold in the EU. At the same time, with all the regulatory improvements in emissions control and specific fuel-efficiency targets, CO2 emissions targets were set independently for cars and vans (see TERM027 for more information).

Smoke levels of heavy duty diesel engines were historically controlled using an opacimeter on steady state and free acceleration tests, as specified in Council Directive 72/306/EEC. The legislation imposed maximum limits for the emission of visible smoke. The first gaseous pollutant limits were developed by UNECE in 1982 with the development of Regulation 49, which set the techniques and limits for the control of CO, HC and NOx. The work at UNECE was later taken up by European Council Directive 88/77/EEC, which first established mandatory limits for new types of on-road diesel engines with regard to their gaseous emissions. Directive 91/542/EEC established the first “Euro” based emissions limits for heavy duty engines, including the regulation of particulate matter emissions, as a consequence of the intensive discussions within the activities of Auto Oil I and follow up revisions by the European Council and the Parliament. These two steps aimed at bringing heavy duty vehicle emissions control on a par with their light duty counterparts. These earlier steps were followed by Decision 1999/96/EC which, in total, defined four new steps for heavy duty vehicle emissions control from 2000 to 2014 (i.e. until the introduction of Euro VI). One significant concept introduced was the definition of Enhanced Environmentally friendly Vehicles (EEVs), i.e. a stringent voluntary emissions step introduced as early as in 2000. This step was more stringent even than the much later introduced Euro V.

Inspection and maintenance programmes are of great importance to the environmental performance of the vehicle fleet. Properly maintained vehicles can be of higher age as long as their environmental performance does not differ too much from the newest technologies. The roadworthiness test Directive 2009/40/EC, repealing Directive 96/96/EC, harmonises the frequency of roadworthiness tests and details which parts of motor vehicles must be tested. The directive aims at maintaining emissions at a low level throughout the useful life of a vehicle by means of regular exhaust emissions tests and ensuring that high emitters are withdrawn until they are brought to a proper state of maintenance.

Targets

There are no specific objectives or targets related to the average age of the vehicle fleet. Policy objectives are rather set with respect to the environmental performance of the fleet.

Related policy documents

- Commission Implementing Regulation (EU) No 725/2011
  Commission Implementing Regulation (EU) No 725/2011 of 25 July 2011 establishing a procedure for the approval and certification of innovative technologies for reducing CO2 emissions from passenger cars pursuant to Regulation (EC) No 443/2009 of the European Parliament and of the Council.
- COMMISSION REGULATION (EC) No 692/2008 on type-approval of motor vehicles

COMMISSION REGULATION (EC) No 692/2008 of 18 July 2008 implementing and amending Regulation (EC) No 715/2007 of the European Parliament and of the Council on type-approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information

- Commission Regulation (EU) No 65/2012
  Commission Regulation (EU) No 65/2012 of 24 January 2012 implementing Regulation (EC) No 661/2009 of the European Parliament and of the Council as regards gear shift indicators and amending Directive 2007/46/EC of the European Parliament and of the Council.
- Commission Regulation (EU) No 195/2013
  Commission Regulation (EU) No 195/2013 of 7 March 2013 amending Directive 2007/46/EC of the European Parliament and of the Council and Commission Regulation (EC) No 692/2008 as concerns innovative technologies for reducing CO2 emissions from light passenger and commercial vehicles
- Commission Regulation (EU) No 406/2010
  Commission Regulation (EU) No 406/2010 of 26 April 2010 implementing Regulation (EC) No 79/2009 of the European Parliament and of the Council on type-approval of hydrogen-powered motor vehicles
- Commission Regulation (EU) No 459/2012
  Commission Regulation (EU) No 459/2012 of 29 May 2012 amending Regulation (EC) No 715/2007 of the European Parliament and of the Council and Commission Regulation (EC) No 692/2008 as regards emissions from light passenger and commercial vehicles (Euro 6).
- Commission Regulation (EU) No 566/2011
  Commission Regulation (EU) No 566/2011 of 8 June 2011 amending Regulation (EC) No 715/2007 of the European Parliament and of the Council and Commission Regulation (EC) No 692/2008 as regards access to vehicle repair and maintenance information.
- Directive 2000/53/EC on end-of life vehicles
  Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of life vehicles - Commission Statements
- Directive 2007/46/EC
  Directive 2007/46/EC of the European Parliament and of the Council of 5 September 2007 establishing a framework for the approval of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles
- Regulation (EC) No 79/2009
  Regulation (EC) No 79/2009 of the European Parliament and of the Council of 14 January 2009 on type-approval of hydrogen-powered motor vehicles, and amending Directive 2007/46/EC
- REGULATION (EC) No 443/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL 443/2009
  Regulation (ec) no 443/2009 of the European parliament and of the Council setting emission performance standards for new passenger cars as part of the community's integrated approach to reduce CO2 emissions from light-duty vehicles.
- REGULATION (EC) No 661/2009
  REGULATION (EC) No 661/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL concerning type-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefor
- Regulation (EC) No 715/2007 on type approval of motor vehicles
  REGULATION (EC) No 715/2007 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 June 2007 on type approval of motor vehicles with respect to emissions from light passenger and

commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information

- REGULATION (EU) No 510/2011
  REGULATION (EU) No 510/2011 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL setting emission performance standards for new light commercial vehicles as part of the Union's integrated approach to reduce CO 2 emissions from light-duty vehicles

Methodology

Methodology for indicator calculation

The population of each vehicle category is distributed in age classes, ranging from 1 to 30 years. The average age is calculated by multiplying the number of vehicles in each class by the mean age of the class (i.e. 0.5, 1.5, 2.5 years etc.) and then dividing the sum of these products by the total number of vehicles in the respective vehicle category (passenger cars, light duty vehicles, heavy duty vehicles, buses, coaches, mopeds and motorcycles).

Methodology for gap filling

Since the average age is modelled, no gap-filling is necessary.

Methodology references

- EC4MACS Average age of road vehicles (2000-2013) from European Consortium for Modelling of Air Pollution and Climate Strategies (EC4MACS).

Uncertainties

Methodology uncertainty

No uncertainty has been specified

Data sets uncertainty

Since the data on the average age of road vehicles are modelled rather than measured, they must be treated as estimates. It should be noted though, that a number of reliable national and international data sources on fleet characterisation (including, for example, Eurostat, ACEA, national experts, etc.) have been used as input to the model. The average age should ideally be 'weighted' to the usage of the vehicle - i.e. the average vehicle-kilometre age of a car.

Rationale uncertainty

No uncertainty has been specified

Data sources

- EC4MACS model (dataset URL is not available)
  provided by **The Laboratory for Thermodynamics of the Aristoteles University of Thessaloniki (LAT/AuTh)**

Generic metadata

Topics:

Transport
DPSIR: Driving force
Typology: Descriptive indicator (Type A - What is happening to the environment and to humans?)

Indicator codes

- TERM 033

  2000 , 2005 , 2010 , 2014

Contacts and ownership

EEA Contact Info

Diana Vedlugaite

EEA Management Plan

2015 1.1.2 (note: EEA internal system)

Ownership

- European Environment Agency (EEA)

Dates

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15 Mar 2016, 01:40 PM
Last modified:
06 Sep 2017, 09:59 AM

Frequency of updates

Updates are scheduled once per year

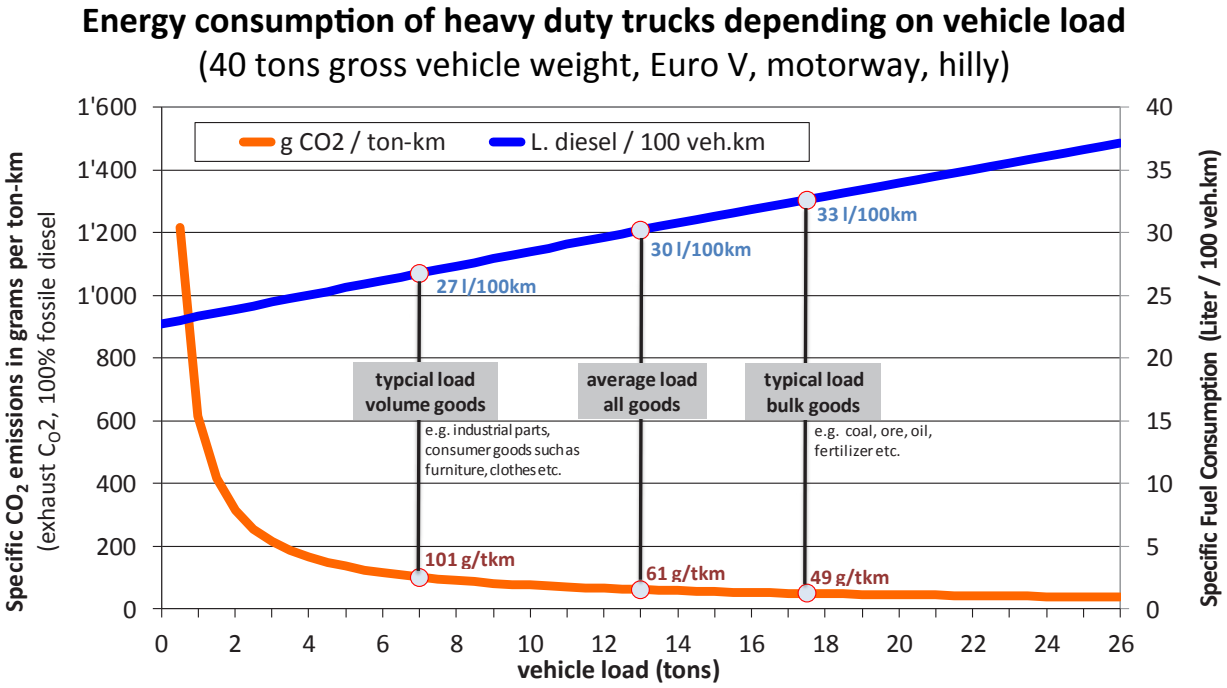
Published on 15 Mar 2016

Appendix 12

Frank Dünnebeil & Udo Lambrecht. **Fuel efficiency and emissions of trucks in Germany: An overview. 24 January 2012. IFEU-Institute Heidelberg. Excerpt page 34**

http://transferproject.org/wp-content/uploads/2014/04/IFEU-2011-HDV-emissions-in-Germany.pdf

Higher loads lower strongly the specific fuel consumption



Source: HBEFA 3.1, EcoTransIT (www.EcoTransIT.org)