ATKINS

Member of the SNC-Lavalin Group

Railway Infrastructure Access Policies Report

Railway Infrastructure Access Policies Report

Rail Baltica

27 April 2022

3.0

Notice

This document and its contents have been prepared and are intended solely as information for Rail Baltica and use in relation to this report

Atkins Limited assumes no responsibility to any other party in respect of or arising out of or in connection with this document and/or its contents.

This document has 199 pages including the cover.

Document history

Document title: Railway Infrastructure Access Policies Report

Document reference: 3.0

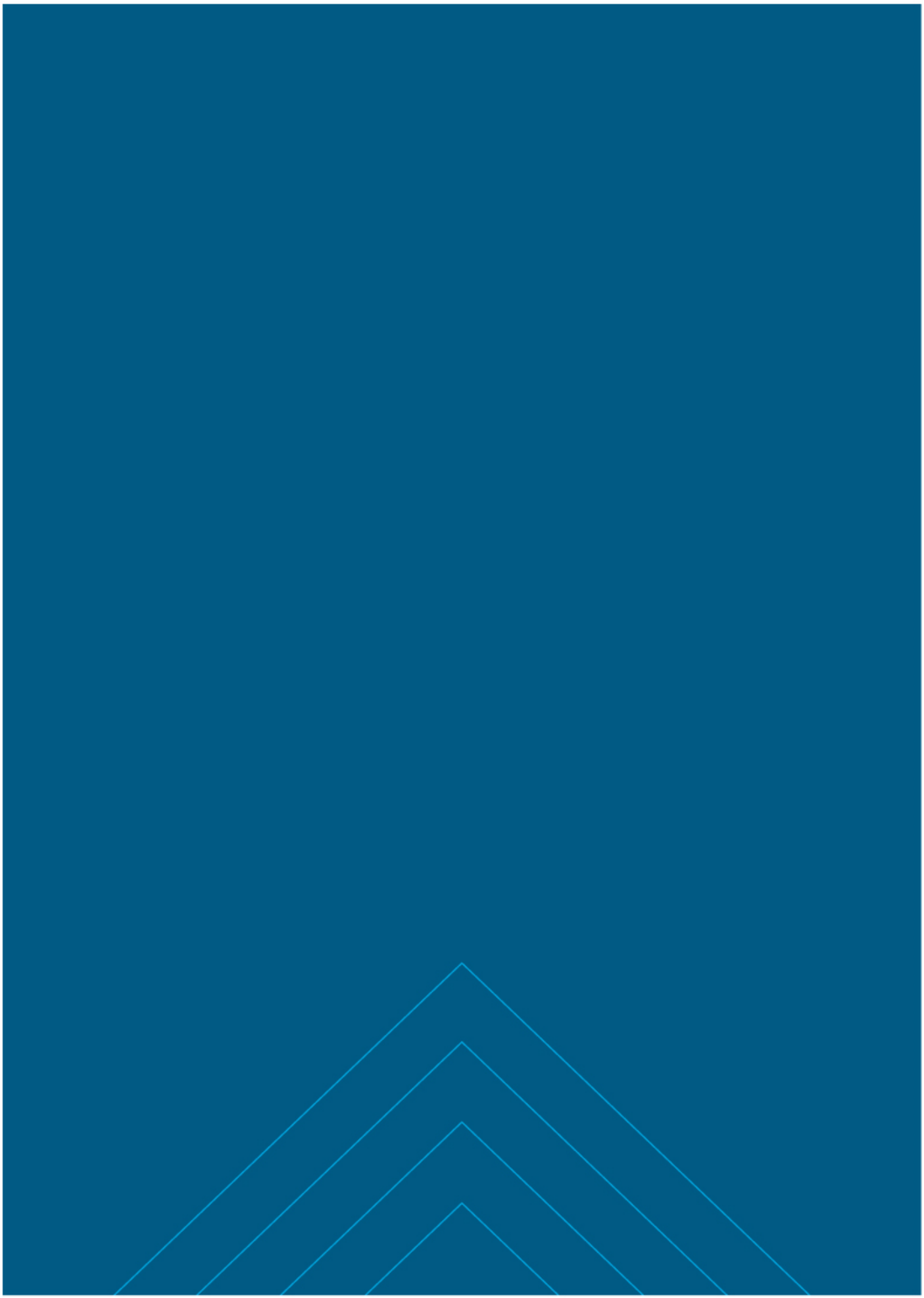
Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
1.0	Completed Report	AG, JT, BW	RB	WL	WL	25/03/22
2.0	Report updated following stakeholder feedback	AG, JT, BW	RB	WL	WL	26/04/22
3.0	Report updated following conference call with stakeholders	AG, JT, BW	RB	WL	WL	27/04/22

Contents

1. Introduction 7
1.1. Aims and objectives of this paper 7
2. Work Package 1 – Capacity Allocation and Access Charging Policies 9
2.1. Why Railway Infrastructure Charging is important (particularly Track Access policy)? 9
2.2. Regulation of TAC 10
2.2.1. Assumptions in this report 10
2.2.2. Coordination of TAC 11
2.3. The constituent and associated elements of TAC pricing 11
2.3.1. Constituent Elements of TAC 11
2.3.2. The associated elements of TAC 15
2.3.3. Prime study 15
2.3.4. *Verkehrsverbund* model 16
2.4. Why Capacity Allocation is important 16
2.4.1. Introduction to mixed use traffic co-ordination and prioritisation 16
2.4.2. Rules of Prioritisation 17
2.5. European regulation 17
2.5.1. Background to legislative framework and early directives 18
2.5.2. Direct Costs 21
2.5.3. Mark Ups 22
2.5.4. TAC 22
2.5.5. Access Charge and Government contributions (Network Grant) 24
2.6. Benchmarking TAC 25
2.6.1. Trend in the cost of TAC for passenger services 25
2.6.2. Trend in the cost of TAC for freight services 25
2.6.3. Comparison of TAC across Europe 26
2.6.4. National Comparisons 29
2.7. Capacity allocation 34
2.7.1. Legislation 34
2.8. Cross Border Operations 35
2.8.1. Cross Border Freight Corridors 35
2.8.2. Cross border mixed use corridors 38
2.9. Summary/Benchmarking 41
2.10. Multi Criteria Analysis Oriented Approach 45
2.10.1. Scenarios 45
2.10.2. Criteria 45
2.11. Should the Baltic States follow Sweden's Example? 50
2.11.2. Discussion for each Country 53
2.12. Analysis of Best Practice 60
2.12.1. TAC 60

2.12.2. Mark Up 61
2.12.3. Capacity Allocation: 62
2.12.4. Congestion Capacity Charge 62
2.12.5. Freight train specification 62
2.13. Summary and Next Steps 63
3. Work Package 2 – Service Contracting Models 65
3.1. Work Package 2.1 Overview of EU Legislation for Service Contracting Models 65
3.1.1. Overview of EU Legislation with regard to the Railways 65
3.1.2. Implications of EU Legislation for Passenger Services 69
3.1.3. Implications of EU Legislation for Freight Services 71
3.2. Work Package 2.2 – Critical Review of Service Contracting Models for Passenger Services 72
3.2.1. Benchmarking of Service Contracting Models across Europe 72
3.2.2. Rail Baltica – Potential Passenger Services 76
3.2.3. Considerations for Passenger Service Contracting Models for Rail Baltica 78
3.3. Work Package 2.2 – Critical Review of Service Contracting Models for freight Services 82
3.3.1. Benchmarking of Service Contracting Models across Europe 82
3.3.2. Rail Baltica – Potential Freight Services 83
4. Work Package 3 – Rolling stock Acquisition Models 84
4.1. Overview of Work Package objectives 84
4.2. Policy and Strategic Context and Assumptions 84
4.2.1. EU Regulatory Framework for Rolling Stock Ownership and Control 84
4.2.2. Rail Baltica Remit 85
4.2.3. Participating Country Regulatory Environment and Policy Objectives 85
4.2.4. Affordability Constraints 86
4.2.5. Capacity and Capability of Stakeholders to Own and Manage Assets 86
4.3. Comparators 86
4.3.1. Cross Border Operations (TBC) 86
4.3.2. National Benchmark Comparators (TBC) 87
4.4. Required Fleets 88
4.4.1. Number of Assets Required 88
4.4.2. Market Capacity and Appetite for Participation in Procurement 89
4.5. Product Availability 89
4.5.1. Technical Requirements and Impact of Any Bespoke Issues (Gauge Switching, Dual Voltage, Multi System Signalling, Passenger Equipment) 89
4.5.2. Existing Fleets 89
4.5.3. New Build Products 91
4.6. Programme Considerations 91
4.6.1. Regional Passenger Rolling Stock 91
4.6.2. High speed/Cross Border Rolling Stock 92
4.6.3. Freight Rolling Stock 92
4.7. Finance Availability and Risk Appetite 92
4.7.1. Public Purse 92
4.7.2. Public/Sovereign Debt 92
4.7.3. Publicly Backed Bonds 93
4.7.4. Private Debt or Bonds 93

4.7.5. Super National (IFI and EIB) Debt 93
4.8. Possible Procurement Parties and Their Capacity to Accept/Manage Risk 93
4.8.1. Technical Design and Approval 94
4.8.2. Commercial/Cost 95
4.8.3. Programme 95
4.8.4. Maintenance/Reliability/Availability 95
4.8.5. Residual Value 95
4.8.6. Procurement Parties 95
4.9. Option Generation 96
4.9.1. Assessment Criteria 97
4.10. Option Assessment 98
4.11. Discussion and Suggested Way Forward 98
4.11.1. Passenger Rail Option 99
4.11.2. Freight Equipment 102
4.11.3. Infrastructure Maintenance Equipment Plant 103
4.12. Rolling Stock Maintenance Facilities 103
4.13. Rolling Stock Key Findings 103
5. Recommendations & Conclusions 105
5.1. WP1 105
5.2. WP2 106
5.3. WP3 107
6. Appendix A 109
7. Appendix B, Analysis of Scope and Contracting parties 156
8. Appendix C, Analysis of Risk Allocation and Contracting parties 159
9. Appendix D, Deep Dive Study on Charging and Funding of European Infrastructure Managers (Civity Management Consultants, 24th June 2021) 163
10. Appendix E, Comments received on report 173
11. Comment received on the role of the regulator on TAC by EDZL 197



1. Introduction

Atkins have been commissioned to provide technical input and recommendations for the Railway Infrastructure Access Policies study. This study consists of three work packages:

- **Work package 1** – Capacity allocation and access charging policies.
- **Work package 2** – Service contracting models.
- **Work package 3** – Rolling stock acquisition models.

This commission was let under a professional services framework contract with RB Rail AS (herein after RB Rail). The fee paid to Atkins is confidential, but the framework has an effective financial cap of 99k Euros for a single study (irrespective of the number of work packages). The request for proposal makes it clear that the work is to be undertaken at a strategic level and that further work may be required going forward before all policy issues in these areas can be fully tested or agreed.

Please note that Atkins also gave a presentation in Riga in person on 9th March 2022 to allow for consultation upon the emerging findings of the study with stakeholders. Comments received on that presentation have been incorporated into this study as far as practical. The presentation and comments can be found in Appendix D.

This work builds on previous work published by RB Rail, DG Move and other bodies as relevant. For example, Atkins took into account the CBA study from RB Rail and recent DG Move Pilot Project on cross-border long distance passenger trains, including night trains published on 16 October 2020.[1] Where appropriate these are referenced in the text and in the footnotes

Currently a multimodal transport demand model is still being finalised to forecast freight demand for the Rail Baltica (herein after RB) line. Passenger demand (or at least international demand) seems to be assumed to be fixed around the existing train service specification. It is important to note though that no emerging results have been shared with Atkins. The level of demand will have an impact on Track Access Revenue. However, both pieces of work were commissioned as independent pieces of analysis.

1.1. Aims and objectives of this paper

The report summarises the key findings in the three work package areas, which consist of the following:

1. **Work package 1** – Capacity allocation and access charging policies:

- Work Package 1.1, Overview of EU law and best practices which includes, providing an overview of EU Legislation regarding capacity allocation and access charging. This section also Provides analysis in regard to best practice for railway infrastructure access policy frameworks in terms of pricing, allocation, and open access opportunities.
- Work Package 1.2, Benchmarking analysis. The benchmarking is based on the following six EU countries: Italy, Spain, Belgium, Netherlands, Sweden and Germany. However, some of the statistical evidence presented includes other countries.
- Work Package 1.3, RB case study, which includes recommendations of best practise that may inform the most suitable railway infrastructure capacity allocation policies and access charging schemes for RB, including methods for calculating Access Charge.

2. **Work package 2** – Service contracting models:

- An overview of EU Legislation regarding service contracting models.
- A critical review of service contracting models for passenger and freight services taking into consideration different types of services.
- Passenger services:
  - High Speed Rail (HSR).
  - Regional international/cross-border.
  - Regional local.

[1] https://back-on-track.eu/wp-content/uploads/2020/10/DG-MOVE-NZ-Back-on-track.pdf

- Night Trains.

- Freight services:
  - Standard (e.g., containerised, intermodal, bulk, piggy-back, etc.).
  - Non-standard (including heavy, project cargo).
  - Dangerous goods.
  - Express services (including e-commerce, light cargo).

3. **Work package 3** – Rolling stock acquisition models:

- Critical analysis of options and recommendations for rolling stock acquisition, including purchase, leasing, and other models (including innovative ones). This analysis is to be carried out with reference to WP2.

2. Work Package 1 – Capacity Allocation and Access Charging Policies

2.1. Why Railway Infrastructure Charging is important (particularly Track Access policy)?

Railway projects are often described as infrastructure schemes. This is true for RB where the greenfield extension from Poland on Europe's standard gauge network is so critical to the project's success and identity. However, railway infrastructure is only of significant practical value when trains operate. This study, and this report, touch on some of the key issues that encourage or discourage trains services from operating.

Along with the operational effectiveness and efficiency of capacity allocation (particularly for international traffic), Track Access Charge (TAC) is the most immediate means of encouraging and discouraging traffic. A high level of TAC will discourage railway traffic as it will make some operations unprofitable and others less profitable. This is particularly true for freight traffic where each individual flow[2] of traffic will form part of the commercial approach of the freight Railway Undertaking (RU), when considering how to compete for that flow.

Key TAC issues include the following:

- Level of TAC that Railway Undertakings have to pay the Infrastructure Manager (IM) for access.
- Use of variable factors in TAC e.g., Higher charges at more congested times and for particular traffic types which encourages particular types of railway operation and modal competitiveness in those circumstances.
- Ability of Railway Undertaking to have their request for access approved at times and with the operating parameters their markets require – both in the timetable and during actual operation (during period of poor operational performance) – yet with regards to the efficient use of the network.
- Potential volume requirement for TAC (particularly for passenger operations) e.g., the requirement for a minimum train service specification (in terms of speed or frequency) that can impact on the commercial viability of an operation.
- Stability, transparency, equality/fairness and certainty of TAC that Railway Undertakings can expect to pay
- Potential requirement for long term commitment from Railway Undertakings (for TAC or rolling stock or service) which does not match their investment timescales
- Required use of the TAC by the IM to provide them with the financial certainty to operate as a going financial concern and quantify the level of collateral or direct government support

These issues go the heart of the type of services stakeholders wish to encourage to use the railway. For instance:

- A TAC that is too high will discourage traffic.
- A TAC that encourages some markets may discourage others than cannot secure capacity or have to pay higher charges (as such a differential can be a form of cross-Network Grant).
- A TAC regime that does not prioritise the most important traffic and require traffic to be efficient risks that the network being clogged up with a low volume of less important traffic that uses up a disproportionate volume of capacity because of operational inefficiencies (such as running much slower than the average traffic on a section of track).
- A TAC regime that requires Railway Undertakings to run a minimum service pattern can make a rail operation commercially unviable as it may include services at times when there are fewer users – although without such a requirement there is a danger network utilisation will be efficient for only a small part of the time when the network is available.
- A TAC that makes no differential in pricing relative to network capacity will not encourage more even traffic patterns across the day.
- A TAC regime that makes a differential in pricing based on environmental factors (such as carbon emissions, other emissions or noise) will better enable rail to support wider environmental objectives.

[2] A flow of freight traffic is a movement between no more than two locations of a single train – i.e., the smallest component of freight traffic which typically consists of multiple flows for a single customer.

- A TAC regime that is seen as unpredictable or discriminatory discourages undertakings to invest or even apply for access.
- A TAC regime with long-term contracts, whilst useful in terms of helping the IM manage the long average asset life of the components of the railway, can risk discouraging Railway Undertaking from taking risks with new traffic flows (passenger and freight) where the market is not certain, and the IM still requires a long-term TAC. This can be resolved by the IM offering "new traffic" shorter terms contracts but that can in turn add extra complexity.
- A TAC regime that that encourages specific types of traffic (including encouraging the use of 'track-friendly' rolling stock) can be used help reduce the whole life cost of the railway and could be implemented with bonus/malus schemes to encourage specific types of technology, but care needs to be taken to get a balance between offering only up to the value of such savings in terms of any discount to the TAC and creating a process that is not so cumbersome that it stifles innovation.

This study though also requires consideration of other potential commercial factors which could have just as significant an impact – in particular the potential for a formalised Public Service Contract ("PSC") (i.e., where a Railway Undertaking warrants it will operate a required service specification under contract) and potential rolling stock lease/acquisition agreements. This study includes options for a PSC (in work package 2), but such contracts may also have a large impact on the TAC regime. Most Public Service Contracts seek to formalise a minimum level of rail operation in return for a Network Grant or premium payment, and often linked with these contracts is a regulatory requirement that this minimum level of service should be given priority network access. This clearly has a knock-on impact on all other Railway Undertakings who might wish to use the network as they will have to fit their services around those that have been contracted.

TACs are one of the most important costs for Railway Undertakings, accounting typically for around 30% of their total costs. Uncertainties related to those costs is a barrier preventing investors to invest in the rail market. Therefore, a good regulation and the certainty of pricing that this brings, could ensure:

- Potential of higher traffic for a Country.
- Attraction of investments in the railway sector.
- Making rail more modally competitive.

2.2. Regulation of TAC

2.2.1. Assumptions in this report

The TAC paid by RU is formally determined[3] by the regulator for that railway. This is explained in more detail in the section in this report that describes EU legislation. However, the regulator works to objectives set by their government and within affordability envelopes. They are also influenced by the application of the IM who is usually left to deliver on the detail on the legislation and in particular implement market segmentation. Therefore, in this report please note that where the incentives and objectives of the IM are discussed that the IM is a free agent but rather that they are regulated but may seek to influence that regulation.

It is understood that the issue of whether there are three IMs or a single IM for the RB route has yet to be formally and finally determined formally outstanding and therefore the way the detailed mechanics of regulation is not yet certain. However, it is also clear that there has been significant progress in agreeing the principles of cooperation so that the benefits of from having a unified approach might be maintained should 3 IMs be decided. One of those principles is agreement on the "main goal of having a common charging setup to the entire Rail Baltica railway".[4] Therefore, it has been assumed in this report that regulatory policies (and TAC) will be consistent along the whole of the RB routes. How this coordination is achieved is outside of the scope of this report. The consequences of not having a coordinated approach to TAC were explained in detail at the presentation on 9th March though formally outside the scope if this study.

[3] Where the word "determine" or "approval" is used in terms of the regulator "determining" or "approving" TAC, it should be noted that this is more of a supervisory role, concern was expressed in detail by Latvia that the regulator is involved in setting the calculation for TAC. Nothing in this report should be taken to mean that the regulator is engaged in producing the TAC, but rather supervising it. Additional information is provided in section 11 of the report, with commentary from EDZL regarding EU Directives and the role of the regulator regarding TAC.
[4] https://rbestonia.ee/wp-content/uploads/2021/12/Annex_Annual-Progress-Report-No-1-2021-1.pdf

2.2.2. Coordination of TAC

In the presentation of the 9th March in Riga Atkins explained what would happen if TAC was not coordinated in a transparent and formal manner. Having uncoordinated TAC rates would mean some traffics paying more in one nation than another per km or per tonne or per trip or per passenger. For most railways this would matter as rates are a matter for national regulators to determine following national policy objectives; however, the majority of RB traffic (freight and passenger) will be international in character. This makes it relatively unique. If an RU pays more for TAC in one nation than another it will automatically cause cross subsidies to occur – and because of the relative importance of international traffic – this will be for a majority of services. This is because revenue will be fixed by the end to end market but the TAC will vary within each nation.

This is financially and politically unsustainable – except where international traffic is disproportionately small which is unlikely to be the case for RB. Those IMs with lower TAC will seek to equalise their rates with the highest on the route. This will cause the TAC to be increased in line with view of the what the market segment can afford help by the IM (and regulator) with the most optimistic view – not necessarily the most accurate view. This means that there is a high probably that the TAC will be set at a rate that is not sustainable and the RU will not operate the proposed service.

Atkins has been advised that this pricing effect of having uncoordinated TAC is understood, and while the regulatory and governance arrangements are unclear, that there is a consensus that the impact of having uncoordinated TAC pricing should be avoided. Therefore, in this report it is assumed that TAC is coordinated across-borders consistent as possible and not influenced by national legislation. No assumption has been made on how this will be achieved.

2.3. The constituent and associated elements of TAC pricing

The TAC is composed of a number of pricing elements – some of which are mandated by EU law and some of which are optional. These are described in more detail in the section set out below.

2.3.1. Constituent Elements of TAC

Two tables are provided below. One table shows the constituent elements of TAC pricing, and whether they are included within the Minimum Access Package (MAP).

The second table shows the associated elements of TAC and whether they are included within the MAP. MAP is a Defined Term, which is explained further on in this report.

In both tables below, dark green represents compulsory elements of TAC (where incurred), and light green represents optional pricing elements of TAC.

Table 2-1 - Constituent Elements of TAC

Constituent Elements of TAC	Included within the MAP
Direct Costs, (including for dangerous goods and military traffic)	Yes
Fixed Access Charge	Yes
Supplemental Charge (for investment)	Yes
Reservation or Cancellation Charge	Yes
Volume Charge	Yes
Congestion and Capacity Charge	Yes
Environmental Charge	Yes
Mark Up	Yes

Table 2-2 - Associated Elements of TAC

Associated elements of TAC	Included within the MAP
Electrification charge	Yes
Charges related to the use of facilities	No
Land rental charges	No
Station Facility charges	No
Station Call Charge	Yes

The most common elements that make up the TAC are as follows:

1. Direct Cost – An Access Charge to use the network equivalent to variable costs caused by the train running on the network – e.g., track wear and tear. This can be equated to the Direct Cost of running a service (Direct Cost is a Defined Term, which is discussed later in this paper). The Direct Costs are a part of the MAP, which is the minimum required for a service to operate. Where services require special operating arrangements, for example for dangerous good or military traffic, this can incur an extra charge. Direct Costs is Defined Term and described in more detail later in this paper.
2. Access Charge (fixed) for the Fixed Costs of the network. This covers operational costs and equipment costs, where it may be difficult to attribute to individual trains, such as the engineering inspection of a mainline, a signaller's shift on the mainline, or telecommunications equipment on a mainline, where the mainline has other services. This can be included with Other Services (in addition) to the MAP. Other Services to the MAP is a Defined term, which is discussed later in this paper. It is important to note that the elements that make up the Access charge are generally common – i.e. used by multiple operators and should one service not operate still be required for all other services. For this reason, they are not Direct Costs.
3. Supplemental Charge (for investment) related to the use of new sections of lines, used by some trains on those lines, and improved infrastructure used by a particular train. In some cases where the improvements lead to a change in the categorisation of the line, e.g., from regular to High-Speed services, a supplemental charge may be accompanied by a change in the rates for a train to reflect the new category of line. Most small upgrades do not attract a supplemental charge because of the requirement for regulatory approval and the administrative and technical burden that this imposes.
4. Reservation or Cancellation Charge for the reservation of capacity or for the cancellation of services, where capacity has been previously reserved.
5. Volume Charge, charged to each Railway Undertaking, which varies with the total volume of trains operated on that network by that Railway Undertaking. For example, in Spain, the largest Railway Undertaking in train kilometres have been also charged a Volume Charge in addition, but this is less in proportion to the Volume Charge applied to smaller Railway Undertakings, as measured in train kilometres. This approach risks being discriminatory. Although it is understood that this pricing element has been used Spain is currently subject to revision and the approach will be discontinued. This is not part of the direct cost; it is a different type of charge related to the volume used by Railway Undertakings.
6. Congestion and Capacity Charge, charged where train operate over parts the network which are most congested, and capacity is most scarce. This is set out under Directive 2012/34/EU.
7. Environmental Charge (not compulsory), which may consist of a discount for trains with a better environmental footprint or added charges for trains that cause more noise pollution, emit emissions (including CO^2 and other greenhouse gases) and/or have other negative environmental impacts. Environmental Charges is a Defined Term in the supplementary literature to EU Legislation. In Sweden Rail freight TAC pricing is significantly reduced through the application of an environmental discount which is subsidised by the Swedish government and underpinned by the environmental (externality) cost of highway freight traffic.
8. Mark Up which is an additional charge that can be added related to the capacity of the market and affordability of a Railway Undertaking to pay such a charge. Mark Up is a Defined Term in the legislation, which is discussed later in this paper. In effect a Mark Up is an opportunity for an IM to "profit" from a flow of traffic but care needs to be taken with the term profit because the level of any Mark Up is limited by the requirement that an IM should not seek reimbursement other for than their Total Efficient Cost at a network level and by the fact that the level of Mark Up should not be set so

high as to deter traffic. The Total Efficient Cost is a Defined Term which is discussed later in this paper. This requires the IM to undertake analytical research to support any Mark Up. Directive 2012/34 states "*Before approving the levy of such mark-ups, Member States shall ensure that the infrastructure managers evaluate their relevance for specific market segments, […]. The list of market segments defined by infrastructure managers shall contain at least the three following segments: freight services, passenger services within the framework of a public service contract and other passenger services."* Undertaking such research is complicated. These complications are discussed below. In summary, the larger a Mark Up is sought for a flow the greater chance that the Mark Up will set so high that it will prevent the traffic from being secured to rail as a mode.[5]

Issues with calculating the price of Mark Up element of TAC:

All the elements of the TAC are subject to formal approval from a regulator, however the level of Mark Up uniquely does not need to be published and transparent (able to be calculated in advance) and can be considered as flexible. In most EU nations this allows the IM to negotiate the TAC for a given flow of traffic on a market basis. This brings with it levels of commercial and policy risk that are significant. This is discussed in more detail later in this paper but in summary it is hard for IM to understand what a market and a given flow of traffic might be able to afford in terms of a Mark Up and how to ensure consistency with other traffic flows within the same market.

On 11 July 2013, in Case C-627/10, action under Article 258 TFEU for failure to fulfil obligations, brought on 29 December 2010, it was found that "the Republic of Slovenia has failed to adopt rules on the basis of which it would be possible to ascertain whether each market segment can actually bear mark-ups in order to obtain full recovery of the costs incurred by the infrastructure manager, in violation of its obligations under Article 7(3) of Directive 2001/14." The key problem for the IM was that the process it had used to test the capacity of the market to bear the proposed TAC was deemed insufficiently robust and transparent. For reasons that are set out below it is very difficult for IMs to understand what the market (for PSO passenger traffic, "open access" passenger traffic and for the various freight segments) can actually afford – and in the case of passenger PSO traffic this can become a political decision.

Whilst on some traffic having higher Mark Ups can generate extra income for the railway, in most cases it does so at the risk of incentivising RUs to reduce services and increasing the need to provide extra subsidy either to the RUs or the IM. Even for those freight flows where it is certain that the end users have the ability to afford higher TAC it usually does so at the expense of the competitiveness of that industry against international competitors and suppresses the use of rail by other factories in the same industry. The national railways of the Baltic states have been able to charge high Mark Ups on international traffic transiting for overseas exports or destined for Kaliningrad, but this comes at the competitiveness of those exporting industries who have no other choice. That will not be the case for the new standard gauge RB line where there are no existing users and unlikely to be an "captive" customers as alternative modes already are in use.

For the passenger traffic negotiations agreeing what services can afford to pay is complicated should there be any PSO services. Most PSOs involve a subsidy or premium payable. Therefore, any Mark Up can have an impact on that level of subsidy or premium. Simply put the level of TAC can be raised on PSO contracts up to any level that does not cause the income of the IM across the whole network to be above the Total Efficient cost. As a result, governments, which are usually the authority behind PSO contracts, can choose whether to subsidise an IM directly or through Rus. It will be seen later in this paper that the is no agreed "best practice" for this as the approach across Europe differs. Such arrangements are made more complicated where both national and local governments contract services under a PSO – as is the case, for example, in France. Local government tends to favour no Mark Up on PSO passenger traffic as it increases the cost of their PSO contracts. They additionally argue that the capacity of passenger operators on local government PSOs is lower, as local services tend to have a lower revenue per trip than national services. National governments on the other hand, can be keen to reduce the direct subsidy to the IM that will otherwise fall on them and to seek parity across all passenger services. In the UK the original approach was to increase the TAC for PSO passenger services so that the IM would receive no direct subsidy. It was felt it would make the IM respond better to the needs of RUs as they would be serving its passengers. Unfortunately, the IM failed to control costs effectively and required extra income to keep operating. This led to an increase in the regulated costs of the IM that

[5] It was pointed out by participants in the workshop on the 9th March that a direct comparison between road and rail for a given market in determining TAC rates can be unfair because many of the subsidies for road transport are hidden. Atkins accepts that this is correct. However, the opportunity exists for governments to set their own road tariff models and they can subsidise RUs or IMs to help equalise the market. This is therefore a political question outside the scope of this study.

government was forced to fund. It chose to do directly rather than via the TAC and PSO subsidy to allow it to exert more direct control over the IM.

Directive 2012/34 article 32/1 requires the IM to consider passenger services that are not contracted as part of a PSO separately. This creates a complexity because most “open access” operators compete (at least at the margins) with PSO operators. In the UK this has been managed by only pricing TAC for open access operators on the basis of the Direct Costs but only granting track access for capacity spare after the PSO contracts have been timetabled and limited competition. This model has come under increasing pressure as open access operated have progressively expanded their operations, acquired grandfather rights and gradually challenged restrictions on their rights to compete directly. The UK government has argued that increased competition between a PSO RU and an open access RU allows the open access RU to “cherry pick” profitable flows and thereby increase the total cost of subsidy. This argument though has become harder to sustain. In other nations, such as Sweden and France, there is a greater level of consistency between the TAC of “open access” RUs and PSO RUs.

For freight, from Atkins’ professional experience of working with IMs, with freight rail undertakings and rail freight customers, most IMs think they understand the freight market better than they actually do and are often one step detached from end customers who typically deal with freight RUs. Their information typically comes from senior staff with historic knowledge that is out date in a competitive “open access” environment. Unfortunately, because these staff are senior it can be hard for IMs to accept that their in-house expertise may not be wholly relevant. This can lead to commercial brinkmanship that can result in traffic being lost to rail as both sides in a negotiation IM and the RU/end customer hold out for their individual views of affordability. The pricing of the freight haulage can be complex – and the TAC element as part of that haulage rate more complex still. To give an idea of the complexity of understanding what a flow can afford please imagine a factory sending a large amount of product in single commodity wagons from a single point to another single point. The temptation is for IM to (1) calculate the road rate and (2) then charge a Mark Up to the RU that means that forces the RU to charge a rail haulage rate (including TAC) that is only just under the road rate. This approach is not sustainable, however. Freight movements are rarely a simple road versus rail movement but part of a wider logistical network. The factory may be competing with another factory that is closer to the end destination that does not use rail – so needs a competitive rail rate to undercut their competition. The factory may be able to send material in containers and that sits within a different road/rail pricing market. The factory may have other traffic to send on other routes where road is more competitive but cannot do so because the IM does not want to offer a lower TAC for this fearing it may undercut their rates. The biggest complexity is that the factory and RU usually feel that they should benefit from a premium using rail, especially where have made the investment in wagons, typically view a high TAC as a tax on their efforts so will strive less hard in future to win traffic to rail. Any negotiation adds extra complexity and that has a cost that alone can be sufficient to deter traffic from using rail. Atkins recently was asked to price several trains to the Baltic States to inform the investment case for new wagons. It proved impossible to secure sufficiently firm rates for commodity traffic that in summary meant the client was unable secure authority to invest in wagons.

Three freight illustrative examples:
This paragraph sets out three more examples known to the Atkins team personally which evidence the complexity of pricing a Mark Up. In all cases it would have been difficult for the IM to understand exactly the capacity of the market to pay a higher or lower TAC.

In first example a large multi-national health products manufacturer (Roche) asked for haulages rates for a doubling of the volumes of their primary feedstock. This request arose because the parent company was seeking to close one of their three global plants and double capacity at another – but critically had not decided which plant should close or remain open; and were comparing the cost of production and logistics at each plant in total. The rail haulier that was contracted by the only factory within the EU at that time was able to carry larger volume by running longer trains and working the wagons more efficiently – rather than running more trains. As a result, they only charged Roche a marginal increase in the cost per train and a very much lower price per tonne. The EU factory recycled this discount per tonne to help win the internal competition and doubled the volume of the primary product carried. This then resulted in an increase in the total volume at that plant that meant rail was more competitive as a mode and other suppliers were able to use this switch competitiveness to switch to rail. This increased the total income to the IM. Had, however, the IM demanded a higher TAC on the initial flow (but kept the rate per tonne km the same or similar) that would have not been possible for the EU Roche plant commercially and the EU Roche plant that would have been closed.

In the second case a logistics firm was used to despatch road vehicles on a regular basis from Germany. The IM used a road/rail haulage rate comparison to justify a high Mark Up and to argue that the RU could premium price the traffic. As a result, the logistics firm stopped using rail from the facility direct and sent some vehicles in containers by road to a nearby intermodal terminal and others road for the whole of their journey.

In the third example, a very large rail customer sought to operate trains directly (rather than use a third-party haulier). To do this they invested in locomotives and wagons to reduce their operating costs and created a specialist firm to undertake the haulage (Mendip Rail). The IM then sought to increase the Mark Up because they calculated they could afford to pay more. This then resulted in a threatened court action at which the regulator was accused of failing in the legal duty to prevent abuses of the monopoly status of the IM. Before the trial the IM took legal advice and reduced their rates.

Other charge elements exist but can also be part of a bonus/malus regime. For example, it is allowed under EU law for an IM to offer a variation based on the use of technologies that reduce the cost impact of providing access (such as the use of “low track force” bogies that reduce track wear) but these are generally a discount/surcharge on the Direct Cost element of the TAC. Best practise is for the net impact of such services to be neutral or offer some incentive to the parties seeking to introduce such technology. Without any incentive it is hard for bodies to justify the effort and risk required in getting the approval and securing a reduction in TAC – especially when such technology can be copied.

2.3.2. The associated elements of TAC

Some supplemental charges can be raised by the IM for the operation of services of the Railway Undertaking on railway infrastructure. These charges do not form part of the TAC, although they may be regulated and part of the same regime and payment mechanisms. Where the IM has a Direct Cost as a result of providing the associated services, they must raise such charges either as part of the Direct Cost or as a supplemental charge, for example this is the case for the supply of electric power for traction. That is not the case for station call charges because the IM may incur no cost for, this subject to how stations are managed and paid for.

9. Electrification charge – which is composed of two elements. It is usual for electric traction rolling stock to pay a supplemental charge, along with the TAC, equivalent both to the costs of the provision of electric distribution equipment where used and separately to the provision of electrical power. EU Legislation limits this charge so that the IM can only charge for costs incurred. EU Directive 34/2012 states that traction current should be supplied to Railway Undertakings upon request in a non-discriminatory manner. The charge imposed for such service should be set under uniform charging principles.
10. Charges related to the use of maintenance depot facilities, stabling, shunting, marshalling yards, and other infrastructure away from running lines. Whilst these charges are regulated, they do not form part of the TAC. EU Legislation limits this charge so that the IM can only charge for costs incurred, plus a regulated return, and only where these facilities are provided by the IM.
11. Land rental charges, this is not part of the Track Access Regime, but is often levied as Railway Undertaking need extra land for railway ancillary activities.
12. Station Facility charges. These charges are where the owner of the station charges users for the facilities at the station, which may be heating, shelter, lighting, passenger information, etc. In most stations in the EU, the IM is the owner and operator of the stations, however this is not a requirement of EU Legislation, and examples exist, where the Railway Undertaking operates the station.
13. Station Call Charge, this relates to where services call at a station, but is separate and additional to the Station Facilities charge above. However, in nearly all EU nations, this is not raised as a separate charge, and this is therefore typically assumed to be included in the TAC, or that no charge is applied.

2.3.3. Prime study

Workshop participants have asked Atkins to consider the study titled Deep Dive Study on Charging and Funding by Civity Management Consultants discussed at the 16th (digital) Plenary Meeting of European Infrastructure Managers in Europe on 19 November 2020. Atkins has been in direct contact with the authors of this report. This exact status of this report is unclear but was due to be completed December 2021. Many of the

objectives of the study match those of this commission so could add additional colour and examples.[6] Unfortunately, when Atkins approached the consultants to request a copy Atkins were told that the study "is internal work of PRIME, the platform of rail infrastructure managers in Europe and not publicly available….. (PRIME) cannot make this study available."
It is recommended that RB Rail ask for a copy PRIME report, possibly through a joint request to the IMs of Estonia, Latvia and Lithuania. If this report is not available, then it cannot be considered as what it concludes will be anecdotal. It is also important to note that the study has been commissioned by IMs only and may not take full account of the objectives of funders, regulators, governments and RUs.

2.3.4. *Verkehrsverbund* model

Workshop participants have asked Atkins to consider the Verkehrsverbund model to test how far this could be applied to RB. In simple terms Verkehrsverbund are regional tariff systems that is simply the product for passengers. They do not cover freight. Such arrangements cover all of Austria, large parts of Germany and Switzerland, and most of the large conurbations in the UK, as well as across other parts of Europe. They encourage cross-modal travel and higher levels of demand through a reduction in ticketing complexity.
Atkins was unable to find any evidence that, other than by exception, they systematically cover cross-national borders. They also often exclude longer distance services. In fact example exist where at the edges of the Verkehrsverbund passengers who wished to travel between areas faced extra barriers. More importantly for this study it is unclear that the commercial arrangements for Verkehrsverbund have any significant influence on TAC rates other than through increasing the use of rail and the implicit warranty of government support through the RU to the IM. TAC rates are still regulated by the same EU legislation.

2.3.5. Introduction to mixed use traffic co-ordination and prioritisation

One of the fundamental problems for a mixed-use railway is that operators will often seek to run trains at the same time or in ways that conflict with each other. Often this is because there are optimal times to operate trains, for example at the start and end of the working day for commuter services. Sometimes this is driven by the operating characteristics of the services, for example single commodity bulk freight trains are typically slower than express passenger trains and, therefore, they can block the line for faster services and undermine the value proposition of having an express service.

Occasionally operators seek deliberately to use their services to frustrate a rival operation; for example, it would be possible, if care is not taken, for the Riga Airport service to run between Riga and Riga Airport at times that could frustrate the operation of longer distance express services, and vice versa. This is sometimes not just a matter of line occupation but the occupation of platforms in stations and capacity in turn backs, yards and sidings also.

It is important to ensure better coordination of allocation schemes in order to improve the attractiveness of rail for traffic which uses the network of more than one infrastructure manager, in particular for international traffic as stated in the EU Directive 34/2012. 'Coordination' means the process through which the infrastructure manager and applicants will attempt to resolve situations in which there are conflicting applications for infrastructure capacity.

Where a situation requiring coordination arises, the infrastructure manager shall have the right, within reasonable limits, to propose infrastructure capacity that differs from that which was requested. Sometimes this process is described as "flexing" where services are retimed with defined limits of the original path application by the Railway Undertaking.

---

[6] Objectives are:

- Describe the existing structures and mechanisms of railway funding and track access charging in each member state;
- Understand the reasoning behind these national systems, considering the individual context;
- Highlight the experience made with these systems, both with regards to positive outcomes as well as difficulties encountered;
- Identify learnings and experiences that can be shared to inform policy and implementation; and
- Draw some conclusions that might help stakeholders to review their existing arrangements and provide inspiration for further improvement.

https://webgate.ec.europa.eu/multisite/primeinfrastructure/sites/default/files/events/05_01_prime_16_deep_dive_study_0.pdf

2.4. Why Capacity Allocation is important

Capacity Allocation is the provision of either long- or short-term rights to operate trains on the railway network. Because most railway networks can have multiple Railway Undertakings operating on a single network (within the EU and areas in line with EU rules such as the UK), common procedures are required to manage those rights especially if there is competition. The outcome of that process is usually expressed as a timetable that tabulates all trains over each section of line. It is recognised that there can be several different timetables: an annual passenger only timetable, a Working Timetable[7] that includes freight and may differ slightly from the passenger timetable especially by including extra details, and short-term timetables where services have been planned on a more immediate basis – particularly for freight services, or during extended maintenance periods. In Germany for example, there are Public Timetables (Includes only the calling times of passenger trains at station), and Working Timetables (Includes intermediates non-station timings, freight trains, empty trains, and extra detail about the tracks being used).

2.4.1. Rules of Prioritisation

If conflicts between capacity requests cannot be resolved during the coordination phase, employment of priority criteria is the most common method for resolving the conflict.

Prioritisation rules differ from country to country and are important for the efficiency of the utilisation of the infrastructure. Objectives of prioritisation could be different, for example, in Italy the regional services in the peak hours have priority to the High-Speed services in the urban nodes.

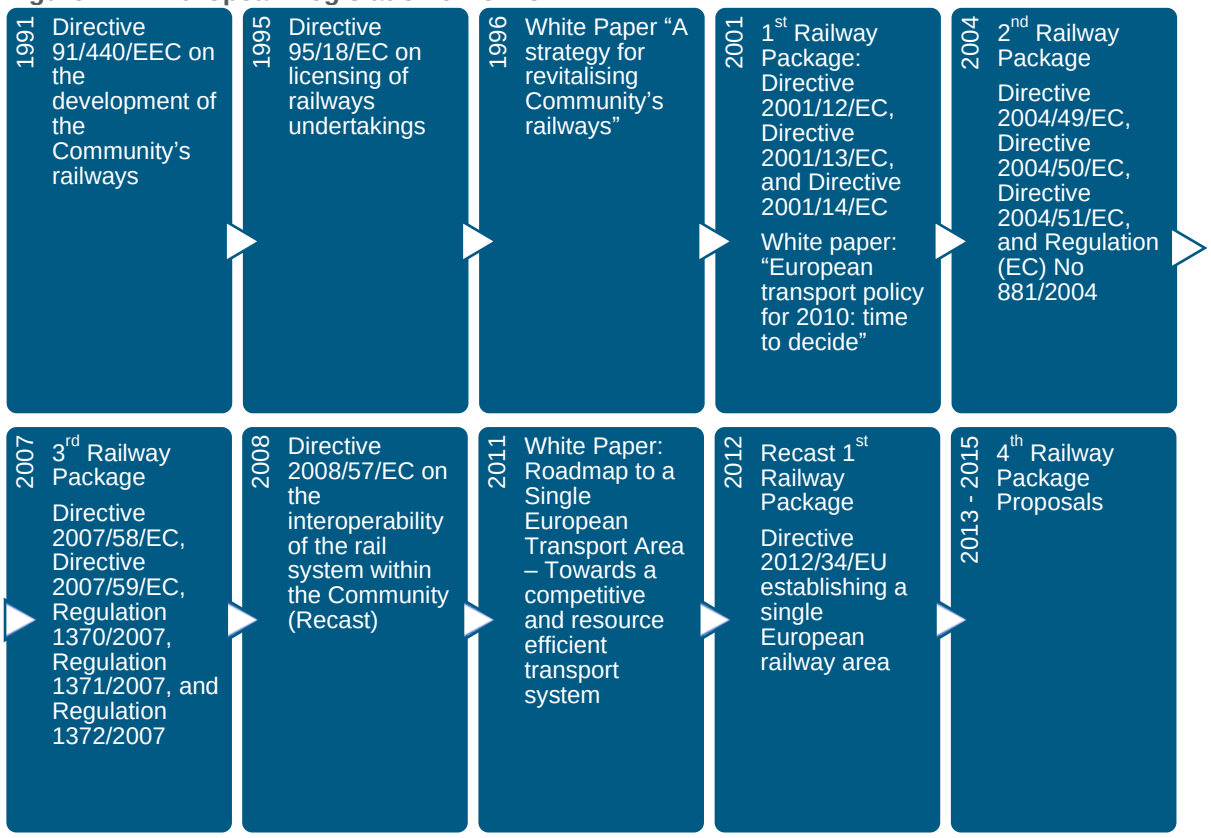
This paper describes how these issues are covered by the Legislation and sets how these issues are covered by the Legislation and benchmarks best practise across case study nations in Europe. It is worth noting that there is little specific Legislation relating to capacity allocation but the general principles for TAC apply and there are established methodological protocols. It is possible for an IM to favour particular traffic types – such services contracted as part of a passenger concession contract. However, traffic prioritisation does need to be undertaken in a transparent fashion.

2.5. European regulation

A summary of the relevant European Legislation is set out below, with the figure below providing a timeline of the various the European Legislation put forward since 1991.

[7] Working Timetable is a Defined Term in the EU Legislation, and refers to a timetable that includes all services (including freight, empty movement, etc.), and extra information over and above the Public Timetable, which is the timetable which passengers use.

Figure 2-1 – European Legislation timeline



2.5.1. Background to legislative framework and early directives

The first Directive regarding TAC was EU Directive 91/440/EEC, on the development of the Community's railways, which was issued in 1991. This made it a legal requirement for independent companies to be able to apply for track access on a European Union country's network, thus allowing them to run services. These are known as 'open access' operations. This right to track access was to be applied on a non-discriminatory basis, thus preventing the favouring of the incumbent national operator that dominated in each of the EU markets up that point.

In 1995, the Directive 95/18/EC was issued on the licensing of 'Railway Undertakings' (the train operators). This set out a framework and guidelines for the EU Member States to provide a licence to organisations operating train services.

2.5.1.1. First Railway Package

The First Railway Package was the collective name given to a series of Legislation issued in 2001. It comprised three Directives:

- Directive 2001/12/EC. Allowed cross-border freight operations in the EU.
- Directive 2001/13/EC. Provided further clarification around the earlier Directive 95/18 on the licencing of Railway Undertakings.
- Directive 2001/14/EC. Set out the framework for the allocation of Railway infrastructure capacity and the levying of charges for the use of the railway infrastructure and safety certification.

The main concerns of this package were to allow international freight operations in Europe, and to establish the principle of charging for track access.

2.5.1.2. Second Railway Package

The measures that became known as the Second Railway Package followed in 2004. It comprised three Directives and a Regulation. These were as follows:

- Directive 2004/49/EC. Concerned with railway safety. It harmonised safety principles across Europe, including setting out procedures for Network Granting safety approvals.
- Directive 2004/50/EC. Harmonised interoperability requirements, particularly around High-Speed operations.
- Directive 2004/51/EC. Allowed open access operations for freight services, both domestically and internationally.
- Regulation (881/2004), accompanying the directives, established the European Railway Agency to coordinate safety and interoperability efforts.

This package of measures was primarily concerned with harmonising safety and interoperability. It also extended open access freight operations to domestic markets in the EU.

2.5.1.3. Third Railway Package

The measures that became known as the Third Railway Package followed in 2007. It comprised the following Legislation:

- Directive 2007/58/EC. Directive on open access passenger operations.
- Directive 2007/59/EC. Directive on harmonised licences for train drivers.
- Regulation 1370/2007. Regulation on open access passenger operations, and subsidised public services.
- Regulation 1371/2007. Regulation on rail passengers' rights and obligations.

The main focus of the 3rd Railway Package was to allow open access operations for international passenger traffic but Regulation 1370/2007 did also set out the rules for the issuing of Public Service Contracts (PSC) to meet Public Service Obligations, including guidance on when, and how, they can be competitively tendered and when, and in what circumstances, they can be directly awarded.

2.5.1.4. Fourth Railway Package

The Council of 21 November 2012 established a single European railway area for the first time. This law set the tone and the principles for more specific rules, for example regarding TAC ("Direct Costs" and "Mark Ups") which are set out below.

The Fourth Railway Package was launched in a document with the title, 'The Fourth Railway Package – Completing the Single European Railway Area to foster European Competitiveness and Growth', dated 30/1/2013. The document was introduced to follow on from the 2011 European White Paper, 'Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system', which unveiled the vision of a Single European Railway Area (SERA). The paper set out the Commission's approach to ensuring the competitiveness of EU transport in the long term, whilst dealing with expected growth, fuel security and decarbonisation.

The Fourth Railway Package is made up of six legislative proposals which came into force in 2016. These focussed on four key areas:

- EU wide approvals: To save time and reduce costs, rolling stock should be built and certified once to run everywhere in European. There should be one safety certificate for companies so they can operate EU wide.
- A structure that works. To ensure the rail network is run in an efficient and non-discriminatory manner, the Commission proposed to strengthen the requirements upon IMs and ensuring that the two functions of managing the tracks and running the trains are separated.
- More access to the railway (the so-called, 'Market Pillar'). To encourage innovation and efficiency, the Commission proposed to open up domestic passenger railways to new entrants and services efficiency
- A skilled workforce: A vibrant rail sector depends on a skilled and motivated workforce. The rail package ensures that Member States can go further to protect staff when public service contracts are transferred.

The purpose of the Fourth Railway Package was to tackle the barriers to entry and inefficient administrative procedures that remained in the European railway market. It effectively aimed to complete the Legislation introduced in the earlier Railway Packages by opening up domestic passenger services for competition, and tightening up on safety, technical and interoperability standards.

The prime Legislation underpinning the Market Pillar strategy, which effectively deals with passenger services, are:

- The Governance Directive (EU) 2016/2370.
- The Public Service Obligation (PSO) Regulation (EU) 2016/2338 (which is an amendment to Regulation (EU) 1370/2007).

The original intention in the Fourth Railway Package Legislation, was that by 2019 Railway Undertakings must be granted access to provide all services, including domestic passenger services, in all EU Member States. During its passage through the European Parliament, however, the requirement to introduce competitive tendering for all Public Service Contracts was put back to 2023.

Directive 2012/34/EU of the European Parliament was added to amend this legislation.

2.5.1.5. Principles behind EU Legislation

Fundamental to all the EU Legislation related to the railway sector, is that such Legislation shall be applied transparently and without discrimination between Railway Undertakings (of the same type). It is possible to discriminate between different types of traffic, for example between freight and passenger as both has different Direct Cost and operate in different markets (With different Mark Ups). For example, in the Netherlands, ProRail charges passenger operators (such as Nederlandse Spoorwegen, Qbuzz, Arriva, Keolis Nederland and Connexxion/Breng) different rates to freight operators (such as DB Cargo, Rotterdam Rail Feeding, Lineas, Rail for Chem, Viola Cargo, ERS Railways, Bentheimer Eisenbahn, HGK, Portfeeders and SNCF Fret); but the passenger operators are charged the same rates for the same types of traffic and the freight operators are charged the same for the same types of traffic and railway operation.

One of the key drivers of the EU Primary Legislation[8] was to prevent railway IMs being pressured politically to favour (former) national Railway Undertakings, formally or informally. The Legislation is clear that it is not sufficient for IMs to act impartially, but they need to follow defined and transparent rules so that they can also be *seen* to act impartially (EU 34/2012). Furthermore, the EU Legislation makes clear how Network Grants should be administered so that they are applied at a network level. This is set out in greater detail later in this report.

This requirement for transparency can be seen, for example, in the definition of Direct Costs to be found in EU regulation 2015/909 which states charges can be levied only where “the infrastructure manager can transparently, robustly, and objectively measure and demonstrate on the basis of, inter alia, best international practice that costs are directly incurred by the operation of the train service.”

There are no other relevant Directives or Regulations that have legal authority, except for those adding some more background or further detail, such as the Commission Implementing Regulation (EU) 2015/909 of 12 June 2015 on the modalities for the calculation of the cost that is directly incurred as a result of operating the train service and the Directive 2012/34/EU strengthens the independence of national regulatory bodies that oversee the national rail market.

In the sections below, these are discussed in greater detail. It is important to note that some of the terms in the EU regulations are Defined Terms and have a specific legal meaning that may not equate exactly with the normal use of such terminology in English. The section includes some of the key Defined Terms and the way they are used to calculate the TAC. Where they first are mentioned a description of the Defined Term is provided.

2.5.1.6. Role of the Regulator

The formula that defines the methodology for the calculation of the Direct Cost, any Mark Up, other TAC constituent elements and TAC associated elements can be proposed by the IM but must be decided by the regulatory body. This regulatory function is critical to ensuring the separation of TAC rule and pricing and its application because it forces TAC rules and prices to be formalised (for regulatory approval) before they are applied, and offers a court of appeal in the event of any disputes between Railway Undertakings and the IM.

The efficient management and fair and non-discriminatory use of rail infrastructure require the establishment of a regulatory body that oversees the application of the rules set out in this Directive and acts as an appeal body, without prejudice to the possibility of judicial review. Such a regulatory body should be able to enforce its information requests and decisions by means of appropriate penalties, including fines.

[8] Primary Legislation refers to laws, rules and guidance, enacted by the EU, which requires national governments, to introduce their own Legislation at a national level.

Article 55, Directive 34/2012 states that each Member State is required to establish a single national regulatory body for the railway sector[9]. This body shall be a stand-alone authority which is, in organisational, functional, hierarchical and decision-making terms, legally distinct and independent from any other public or private entity. It shall also be independent in its organisation, funding decisions, legal structure and decision-making from any IM, charging body, allocation body or applicant. It shall furthermore be functionally independent from any competent authority involved in the award of a public service contract.

The regulatory body shall have the power to request relevant information from the IM, applicants and any third party involved within the Member State concerned.

The financing of the regulatory body should guarantee its independence and should come either from the State budget or from contributions of the sector levied in a compulsory way, while respecting the principles of fairness, transparency, non-discrimination and proportionality.

According to the Directive 2012/34/EU, an applicant shall have the right to appeal to the regulatory body if it believes that it has been unfairly treated, discriminated against or is in any other way aggrieved, and in particular against decisions adopted by the IM or where appropriate the Railway Undertaking or the operator of a service facility concerning:

a. The network statement in its provisional and final versions.
b. The criteria set out in it.
c. The allocation process and its result.
d. The charging scheme.
e. The level or structure of infrastructure charges which it is, or may be, required to pay.
f. Arrangements for access to the network.
g. Access to and charging for services.

The role of the Rail Regulator is more complicated where more than one regulator is involved which will be the case for international traffic.

IRG Rail is the "Independent Regulators' Group – Rail", a network currently comprising independent rail Regulatory Bodies from 31 European countries. On 9 June 2011 fifteen independent rail Regulatory Bodies signed the "Memorandum of Understanding" for the establishment of the Independent Regulators' Group-Rail. They have voluntarily formed the group to facilitate cooperation in their common interests for the promotion of the internal railways market. The overall aim of the Independent Regulators' Group – Rail is to facilitate the creation of a single, competitive, efficient and sustainable internal railways market in Europe. The IRG-Rail acts as a platform for cooperation, information exchange and sharing of best practice between national railway regulators in order to face current and future regulatory challenges in railways and to promote a consistent application of the European regulatory framework.

However, this group – along with the creation of "one stop shops" established by Article 13 of regulation EU 913/2010 concerning a European rail network for competitive freight – is principally concerned with improving operational efficiency. It does not establish a common TAC pricing framework. Therefore, and critically, if RB Rail is assumed to become the IM and a multi-national entity, then the regulator will need to be a multi-national entity or that the separate national IMs be bound by international rules that means they are forced to act uniformly. The requirement for such rules means that any super-national RB IM may need to be established by treaty (or binding contract), and such a contract will probably be required to define the parameters for the pricing of the TAC, and probably the level of Network Grants it could be given to the IM.

2.5.2. Direct Costs

The European Regulation 2015/909 states that rail services should pay at least their Direct Costs for track access and defines what elements make Direct Costs that can be included in the Access Charge. "Direct Costs" is a Defined Term meaning *the costs directly incurred as a result of operating the train service*, while the Mark Ups are levied in order to obtain full recovery of the costs incurred by the IM, if the market can bear this. The section below discusses the issues related to Direct Costs and Mark Ups in more detail.

EU regulation 2015/909 issued on 12 June 2015 states that Direct Costs are "only (those) that it can objectively and robustly demonstrate that they are triggered directly by the operation of the train service. For example, wear and tear of track-side signals and signal boxes does not vary with traffic and therefore should not be

[9] "Each Member State shall establish a single national regulatory body for the railway sector" article 55, Directive 34/2012

subject to a direct cost-based charge. Conversely, parts, such as point infrastructure, will be exposed to wear and tear by operating the train service and thus should partially be subject to a direct cost charge."

Further detail on the legislation and Calculations of the Direct Cost at a Network level can be found in the Appendix sections 6.A.1.1.1 and 6.A.1.1.2.

2.5.3. Mark Ups

European Legislation states that it is permitted for railway IMs to "Mark Up" their TAC. The European legal basis of "Mark Ups" is set by Directive 2012/34/EU. Critical to Mark Up is market segmentation and the mechanism by which an IM avoids applying the same Mark Up to all traffic, as explained below.

Further detail on the legislation of Mark Ups can be found in the Appendix section 6.A.1.2.1.

2.5.3.1. Financial limit to Mark Ups

However, Directive 2012/34/EU also sets the limits to how high Mark Ups can be charged. There is a general obligation for IMs to have regard to "*guaranteeing optimal competitiveness of rail market segments".* More specifically: *"The level of charges shall not, however, exclude the use of infrastructure by market segments which can pay at least the cost that is directly incurred as a result of operating the railway service, plus a rate of return which the market can bear...:"*

This effectively prohibits Mark Ups to be included in the TAC by an IM high enough to cause a market segment that can pay, to pay Direct Costs and be priced out of using rail, rather than other modes. It is not permitted for IMs, for example, to increase the TAC for particular types of freight traffic to force them off the network – especially where such traffic is inconvenient and has a low political priority. However, given that most passenger services could attract direct government Network Grant, the issues of their ability to pay a higher Mark Up is somewhat unclear. The Legislation was not designed in the event of there being no direct Network Grant to the IM; is there is no subsidy then there will be an increased Mark Up. That though is not the case for freight which is very easy to "price off" as the IM will not easily be able to determine the capacity of the railway undertaking to pay. That though is not the case for freight which is very easy to "price off" as the IM will not easily be able to determine the capacity of the railway undertaking to pay.

2.5.3.2. Market Segmentation for Mark Up

Article 32(1) of EU Directive 34/2012 suggest that Marks Ups should at least consider differentiating between traffic by the following:

- Passenger versus freight services.
- Trains carrying dangerous goods versus other freight trains.
- Domestic versus international services.
- Combined transport versus direct trains.
- Urban or regional versus interurban passenger services.
- Block trains versus single wagon load trains.
- Regular versus occasional train services.

But, it is permitted under EU law to use, the Mark Up process also to use Mark Ups to deliver on government policy or include other factors. These are different from changes to Direct Costs but may relate to an Externalities cost – that is where it is perceived that the characteristics of track access have a policy impact but not a cost impact.

Examples of how this operates can be found in the Appendix section 6.A.1.2.2.

2.5.4. TAC

TAC is a Defined Term and is the total charge to all Railway Undertakings using the network. The TAC charge is made up of[10]:

1. Direct Cost (of all services).
2. Mark Up (of all services that have a Mark Up).

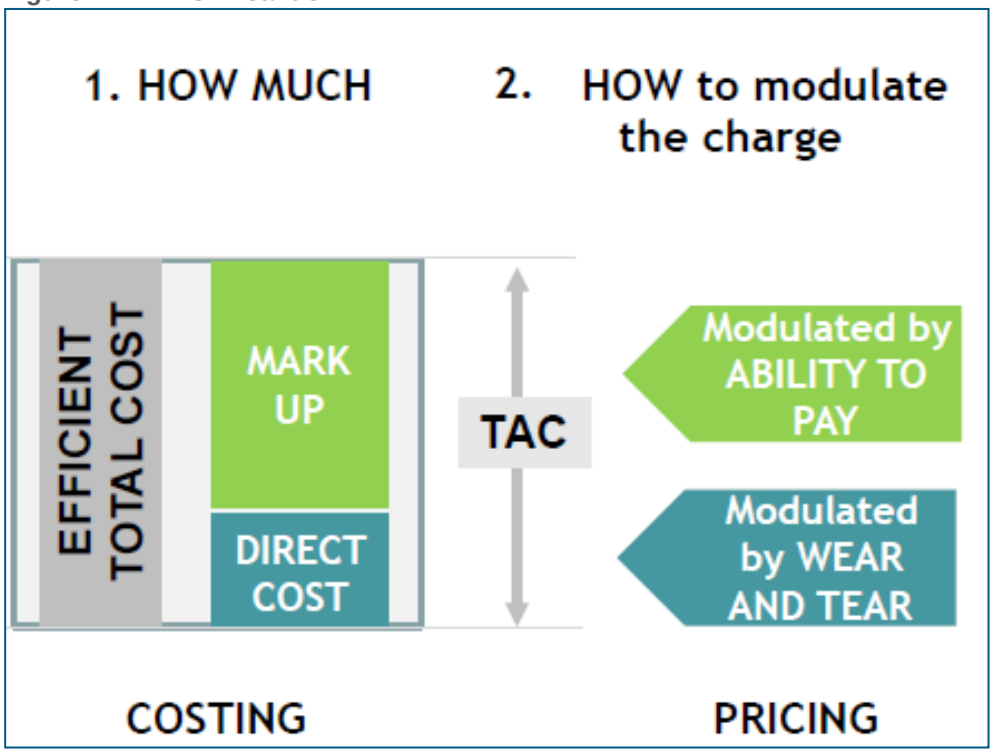
[10] To understand the context of MAP, see sections 6.A.1.1.2, 6.A.1.3.2 and 6.A.1.3.3.

- The Mark Up could be Zero if State Network Grants cover all the IMs Admissible Costs (described in 2.4.2 paragraph), except for the Direct Cost.

One simple way to look at the difference is that:

- One part of the Total Efficient Cost is linked to the Direct Cost of the IM is driven by wear and tear.
- The Mark Up part of the Access Charge is driven by the ability/capacity of the different segmented traffic types to pay.

Figure 2-2 - TAC Breakdown



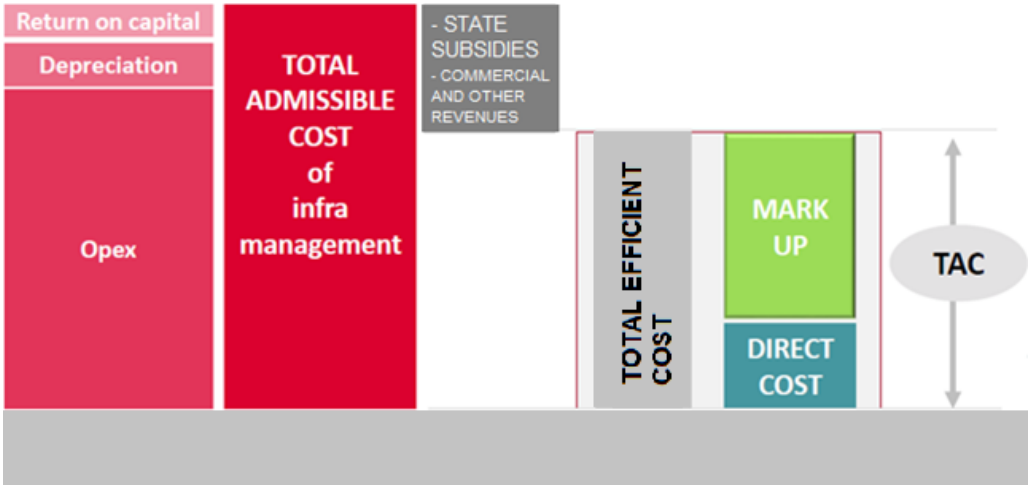
- Efficient total cost is given by the sum of the Direct Cost and the Mark Up.
- The MAP is paid by all the Railway Undertakings, both PSO and open access services and the pricing is related to the wear and tear for the Direct Cost and the ability to pay for the Mark Up.

Further details relating to the components that constitute the TAC can be found in the Appendix in section 6.A.1.3.3.

2.5.4.1. Wider TAC Framework

The section below discusses how TAC (and Direct Costs and Mark Ups) fit within the wider financial framework established by the Legislation for railway IMs.

Figure 2-3 – TAC Costing



2.5.4.2. Total Admissible Cost ("TAdC"):

The Total Admissible Cost includes all costs relating to the operation of the network and defined financial mechanisms associated with investment in the network (depreciation and return on capital).

The return on capital is generated by applying a rate of return to the Net Invested Capital (NIC), according to the method based on the weighted average cost of capital (WACC). The level is decided by the regulatory body following analysis undertaken on the utilities sector more generally.

Further details on TAdC can be found in Appendix section 6.A.1.3.1

2.5.4.3. Total efficient Cost ("Cnt")

The Total efficient Cost (Cnt) is the total cost for which the IM is permitted to seek TAC charges. It is similar to but less than the TAdC, as it excludes the Network Grant and some commercial income.

Further details on CnT can be found in Appendix section 6.A.1.3.2.

2.5.5. Access Charge and Government contributions (Network Grant)

A number of EU states subsidise their rail infrastructure. This is permitted providing that the Network Grant is transparent and does not cause the IM to discriminate between Railway Undertakings of the same type. For example, in Scandinavia governments have typically sought to subsidise the national IMs to allow them to keep freight TAC low to strengthen rail freight as a mode in competition with highway traffic, because of the social and environmental benefits of rail freight as compared to road freight. In the UK the government has subsidised the IM directly to avoid having to compensate rail public concession operators who enjoy protection from increases to TAC charges (and the complicated process that involves), after the regulator allowed the IM to charge a higher Total Admissible Cost for operating the network (because of changes to the cost of operating the infrastructure).

Critically, any Network Grant to the IM is applied at a network level, as can be seen in the figures below. The figure also highlights the three main ways in which states are permitted to subsidise the IM financially (As stipulated EU Directive 34/2012), as follows:

1. Through a direct reduction of Total Admissible Cost. That is through an impact on area 1 in the figure below.
2. Direct state contribution (though formally contracted) with IM. That is through an impact on area 2 in the figure below.
3. Indirect state contribution to the IMs to reduce the access through support for Railway Undertakings (particularly through concessions). That is through an impact on area 3 in the figure below.

These three state support options are discussed in turn in the Appendix sections:

- 6.A.1.4.1 – Reduction of Total Admissible Cost by Network Gran.
- 6.A.1.4.2 – State contribution (Network Grant) with contract program with IM.
- 6.A.1.4.3 – Contribution (Network Grant) to the IMs to reduce the Access Charge for Railway Undertakings.

2.6. Benchmarking TAC

This chapter of the report provides a benchmarking analysis, based on the European Legislation section further on in this report and how it is applied differently across Europe. Also, details relating to comparisons of density of traffic and Network Grants to the IM can be found in Appendix section 6.A.2.2 & 6.A.2.3.

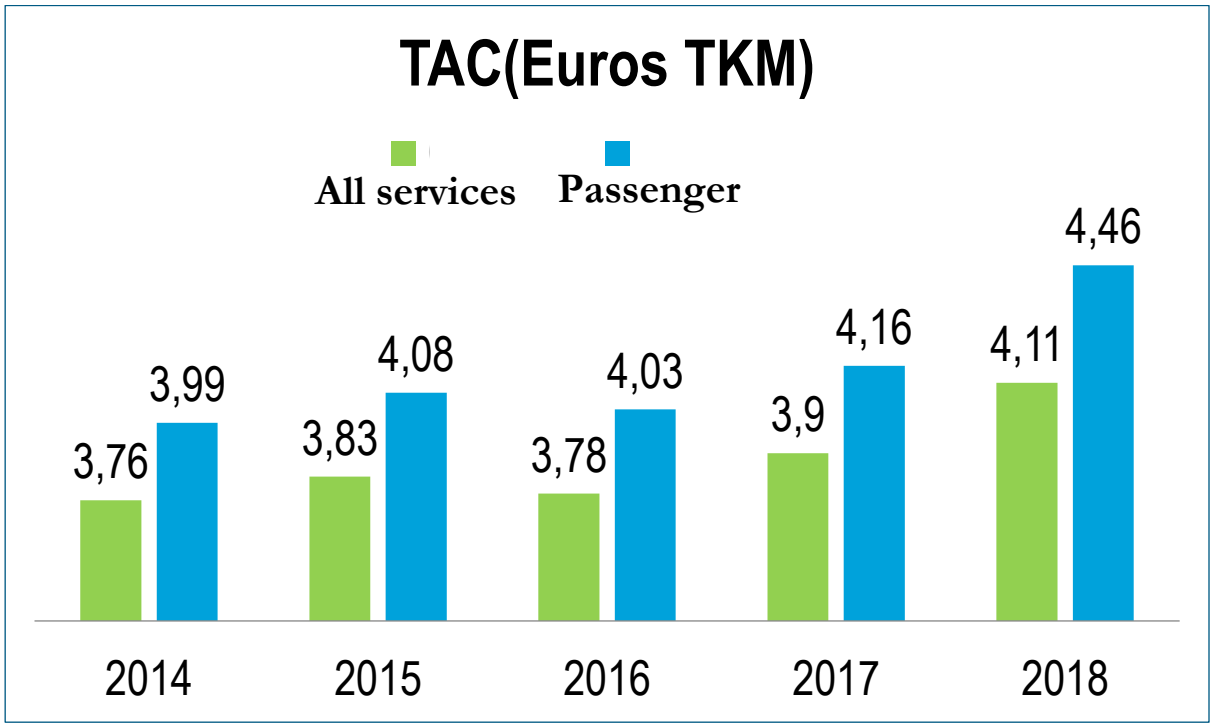
2.6.1. Trend in the cost of TAC for passenger services

In EU the cost of TAC (see figure below) has been increasing in the last five years, mainly due to an increase in passenger Access Charges.

According to an estimation made by the Independent Regulators Group (IRG) concerning the average TAC paid by Railway Undertakings in the EU in 2018 the average TAC was around 4 Euros per Train KM (TKM) for all the trains, while for the passengers trains the TAC was around 4.5 Euros per TKM. This estimation was published in 2020 and does not contain data after 2018.

TAC has been subject to regulatory approval in all the countries included in this analysis – as is a requirement of EU law.

Figure 2-4 – TAC costs of European Union between 2014 and 2018

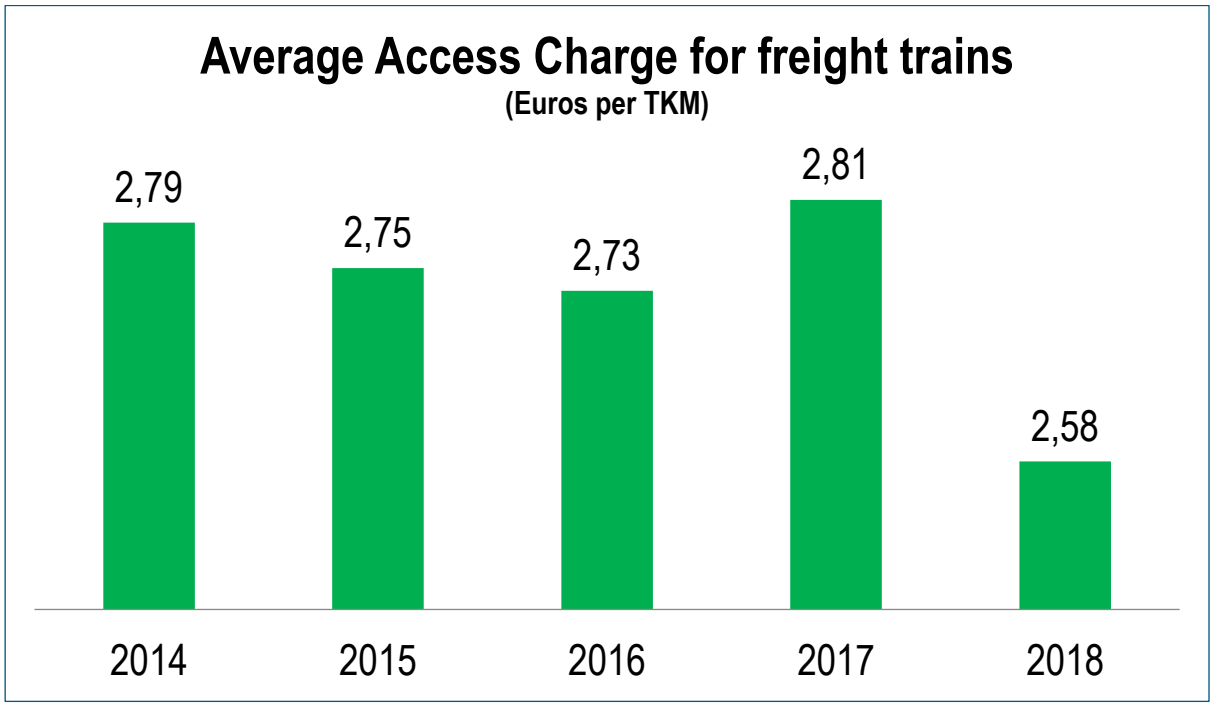


Source: https://irg-rail.eu/download/5/723/IRG-Rail-8thMMReport-final.pdf page 8

2.6.2. Trend in the cost of TAC for freight services

For the freight TAC, still based on IRG estimation, the level has been instead decreasing during the same time period to reach the value of around 2.6 Euros per TKM in 2018.

Figure 2-5 – TAC costs for freight trains between 2014 and 2018



Source: https://www.irg-rail.eu/irg/documents

2.6.3. Comparison of TAC across Europe

Information is provided below to allow for comparison of TAC across Europe, further to this the following Appendix sections provide further information:

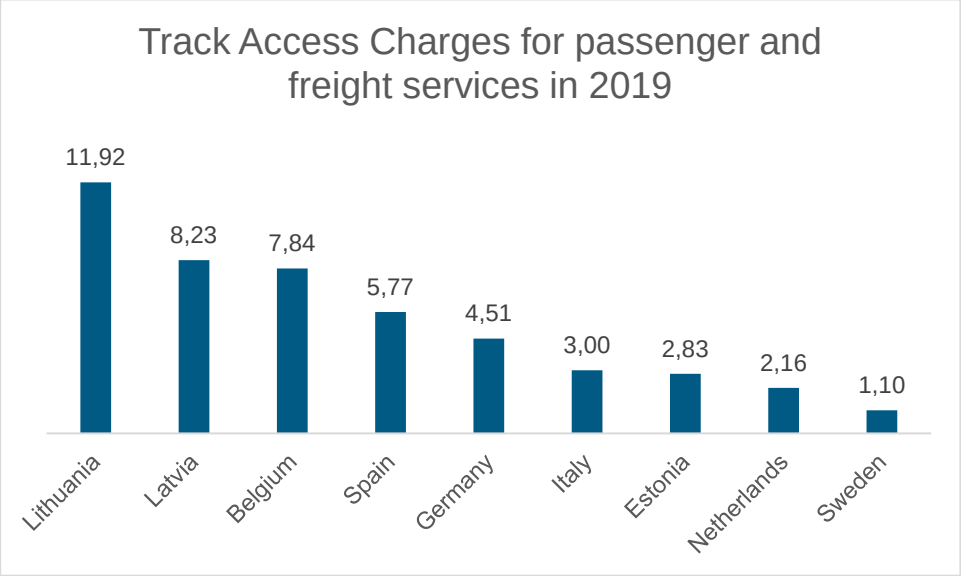
- 6.A.2.1.1 Trends in the cost of TAC for freight per net tonne-km.
- 6.A.2.1.2 Comparison in the TAC rate for freight per net tonne-km.
- 6.A.2.1.3 Comparison of revenues by freight operators/in the EU.

TAC across the EU markets widely vary, as can be seen in the figure below. Lithuania and Latvia have the highest TAC level, followed by Belgium, Spain and Germany.

The difference in TAC is partly explained by the difference in average tonnage of freight trains[11], and other factors such as environmental considerations. This is discussed in more detail later in the report.

[11] This is particularly the case in Poland, Finland and Hungary, in addition to the figure above, because these nations have large heavy freight. But this is not the case in countries such as Italy and Portugal.

Figure 2-6 – TAC costs per train kilometre combined for passenger and freight services



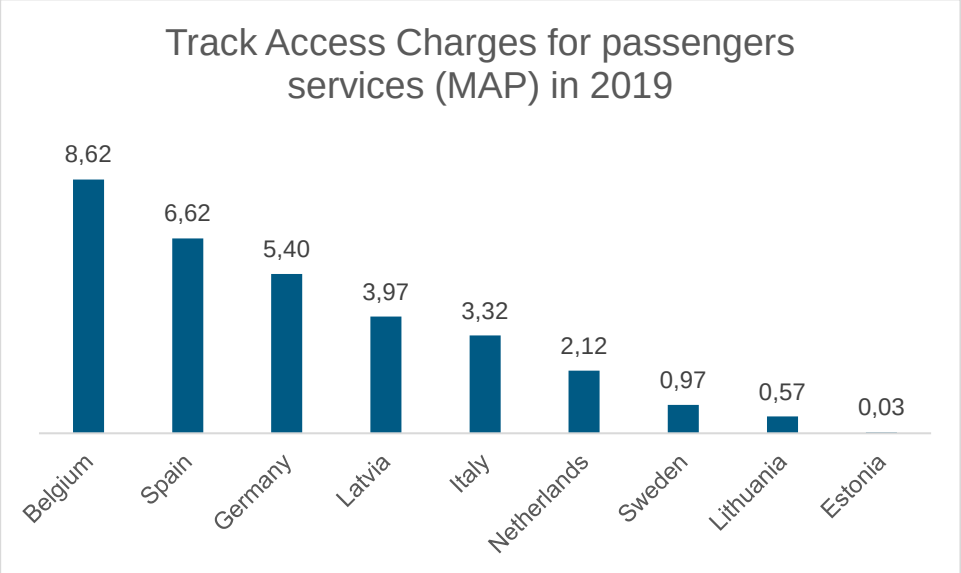
Source: https://www.irg-rail.eu/irg/documents

However, the differences in TAC levels by country also reflect, among other factors, the different level of the components A and B (described in Section 2.6.4 of this report) in different countries. For instance, the relatively high TAC rates for Lithuania and Latvia partly derive from their high freight TAC rates, reflecting the fact that these railways form a short section at the eastern end of long flows of Russian and Belarus traffic therefore allowing for higher Mark Ups for freight traffic

2.6.3.1. Comparison of the rate of TAC for passenger services

The figure below shows that Belgium has highest TAC for passenger services, whilst Lithuania and Estonia have the lowest. In Belgium and Spain there is little opportunity to Mark Up freight TAC because of intense modal competition so the full cost has to be borne by passenger services (Where there is also government Network Grant). In Lithuania and Estonia, there is an opportunity to have a high freight Mark Up (As the ability to pay for the freight is higher), which reduces the need for a high Mark Up of passenger TAC.

Figure 2-7 – TAC costs per kilometre for passenger services

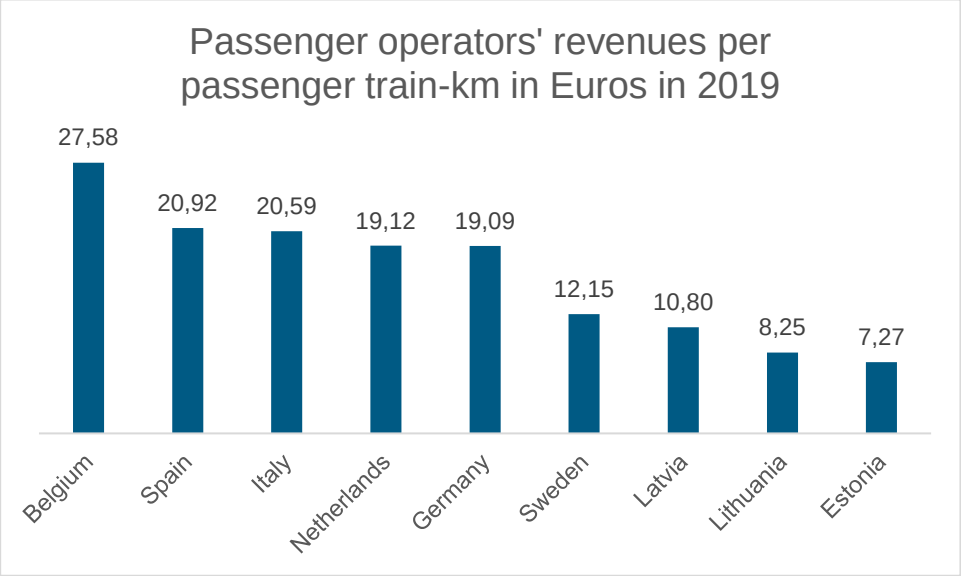


Source: https://www.irg-rail.eu/irg/documents

2.6.3.2. Comparison of passenger operators per passenger-km

Belgium and Spain have the highest level of Passenger operators' revenues per passenger TKM and the three Baltic States have the lowest level of revenues.

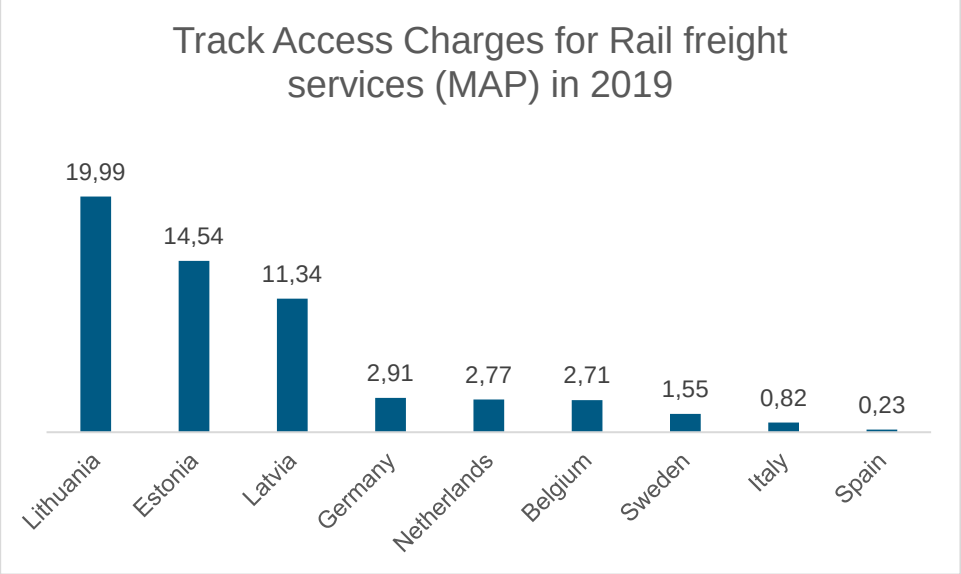
Figure 2-8 – Passenger operators' revenues per passenger train-km



Source: https://www.irg-rail.eu/irg/documents

2.6.3.3. Comparison of the rate of TAC for freight services

Figure 2-9 – TAC costs for per freight train kilometre



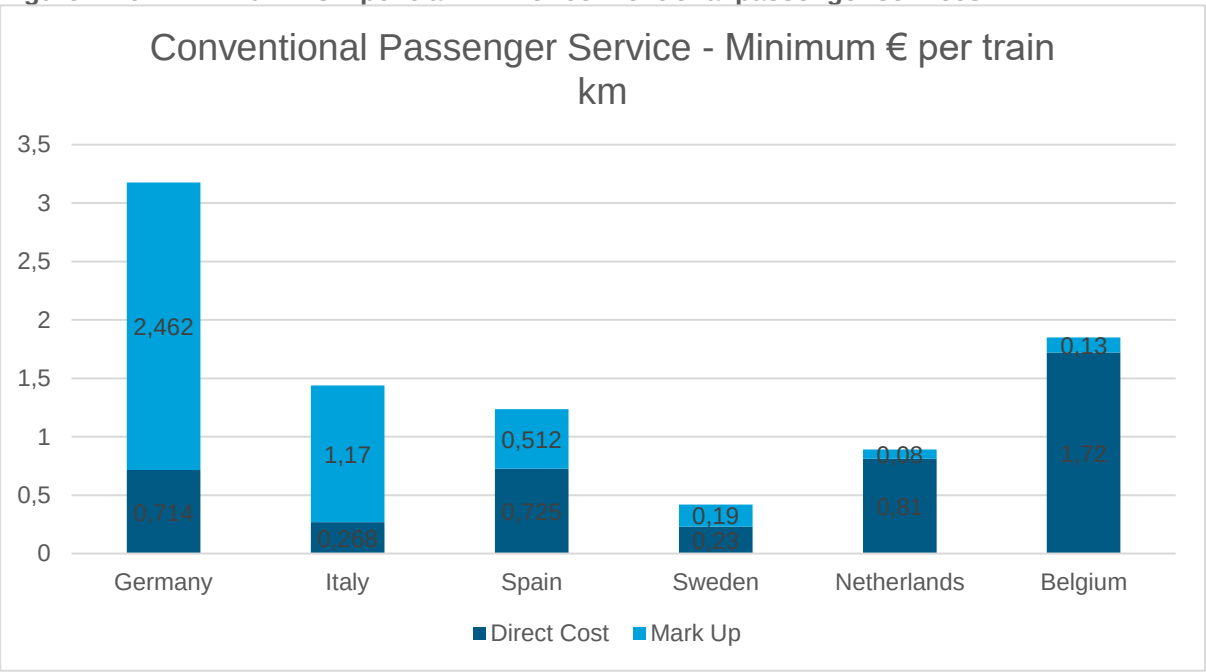
The three Baltic States have the highest level of TAC for rail freight services, and are much higher when compared to other European countries. This is because these three nations have historically carried significant volumes of long distance freight from landlocked locations within Russia and Belarus, where the distance for these freight trains within the Baltic states is small in proportion to the total distance travelled and where there are very limited alternatives for the exporting industry. This means the national IMs of the Baltic States have been able to charge premium rates. Such premium rates will not work for traffic on the RB standard gauge railway because there are already alternative logistical routes in operation and the proportion of traffic that will start/end with Russia/Belarus will be very much lower.

2.6.4. National Comparisons

The following section provides a summary of national comparisons passenger and freight services, with further detail provided in Appendix section

2.6.4.1. Summary of Passenger Service

Figure 2-10 – Minimum EUR per train km for conventional passenger services



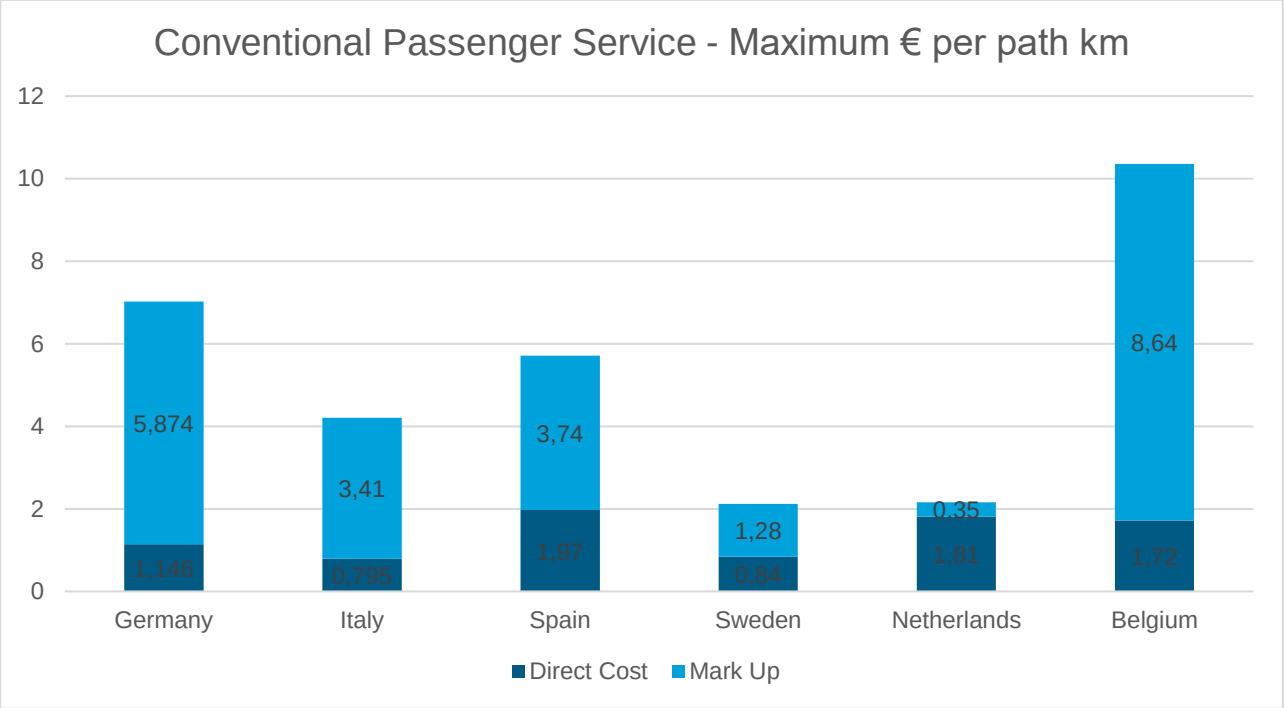
In Germany, the highest TAC level is applied of around 3.2 Euros per train km, while in Spain and in Italy, there are TAC between 1 and 1,5 Euros per train km. In Spain, there is a higher impact of direct cost component than in Italy.

In Sweden, there is the lowest level of TAC and it is possible to underline the low level of component A and B. The component A in Sweden is very dependent on the weight of the trains and given that there are many weight classes, it is possible to have a big differentiation between different trains.

In Belgium, there is no variation of the component A for all type of rail transport and there are some categories of lines (low traffic) that have a very low level of Mark Ups.

For the passenger trains, there is a big difference also for the maximum levels of TAC.

Figure 2-11 – Maximum EUR per path km for conventional passenger



Sweden has a very low level of TAC, due to a low level of the component A and the maximum track Access Charge for conventional passenger rail is 2.12 Euros per train km.

In the Netherland the maximum track Access Charge for these services is 2.16 Euros per train km.

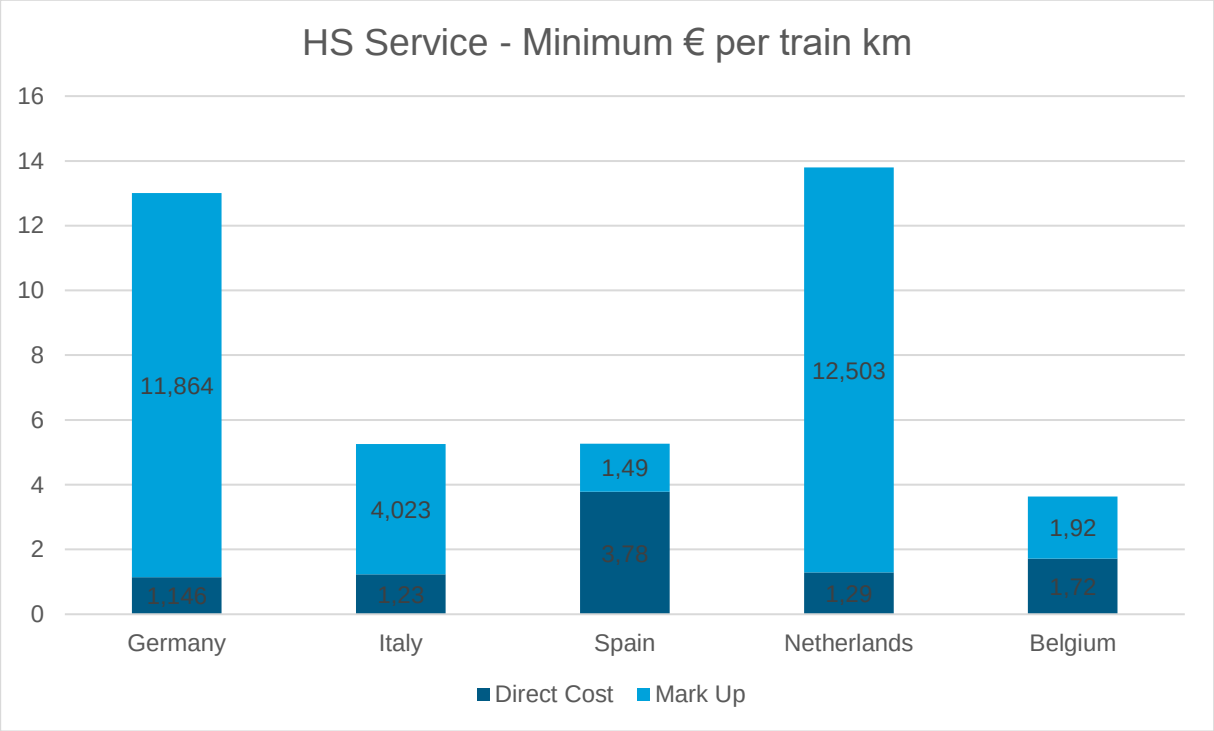
The component A vary between 1.97 Euros for the conventional passenger trains in Spain and 0.84 Euros in Sweden.

The component B is around 3.4 Euros in Italy, in line with the value of Spain, while the highest value is for Belgium and Germany.

In Belgium, the Mark Up is 8.4 Euros per train km and it is related to the traffic of the peak hour.

The lowest level for the Mark Up is in the Netherlands, 0.35 Euros per train km.

Figure 2-12 – Minimum EUR per path km for High-Speed services



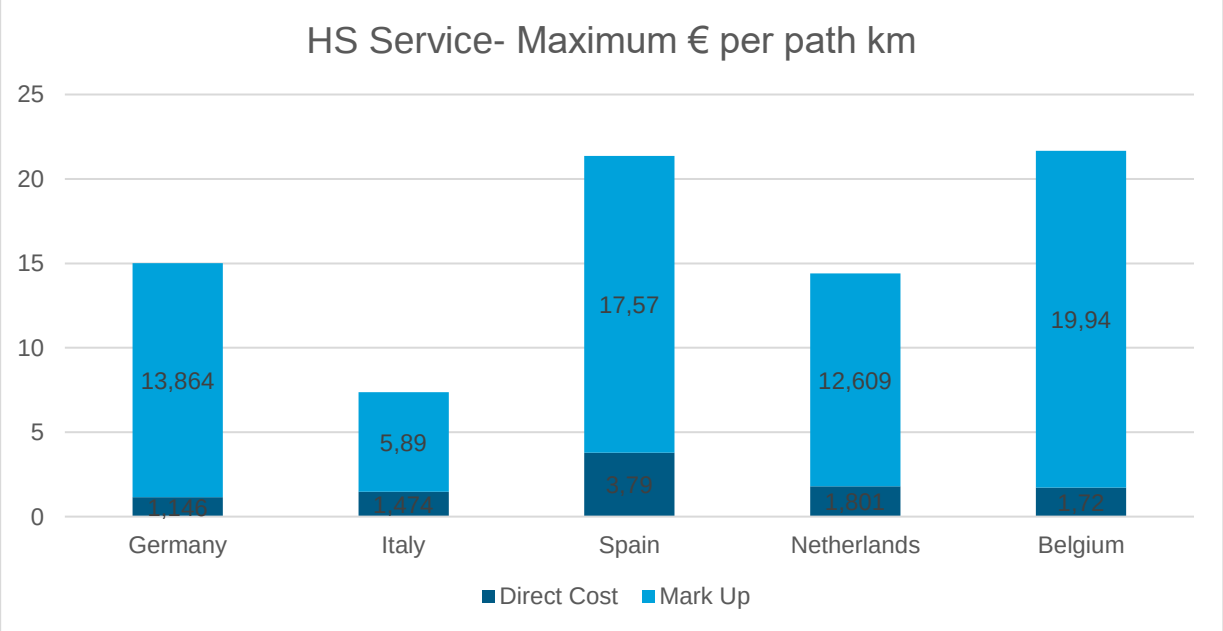
For the High-Speed services, the lowest track Access Charge is in Belgium for the off-peak hours (late evening and night services). In this case, the track Access Charge is lower than 4 Euros per train km.

In Italy and Spain, the lowest level for the track Access Charge is around 5.3 Euros per train km, but there is a big difference between two countries: in Spain, the direct cost component is 3.78 Euros per train km, while in Italy 1.23 Euros per train km.

In the Netherlands and Germany, there are the highest value of the track Access Charge, respectively of 13 and 13.8 Euros per train km.

For these two countries the Mark Up component is relevant.

Figure 2-13 – Maximum EUR per path km for High-Speed Services



Italy has the lowest High-Speed rail maximum TAC with a level of 7.36 Euros per train km. Italy was the first country to have open access competition in the High-Speed rail and the reform of the track Access Charge was completed in 2015.

The lowest direct cost is for Germany 1.15 Euros per train km, while the highest is for Spain with 3.79 Euros per train km.

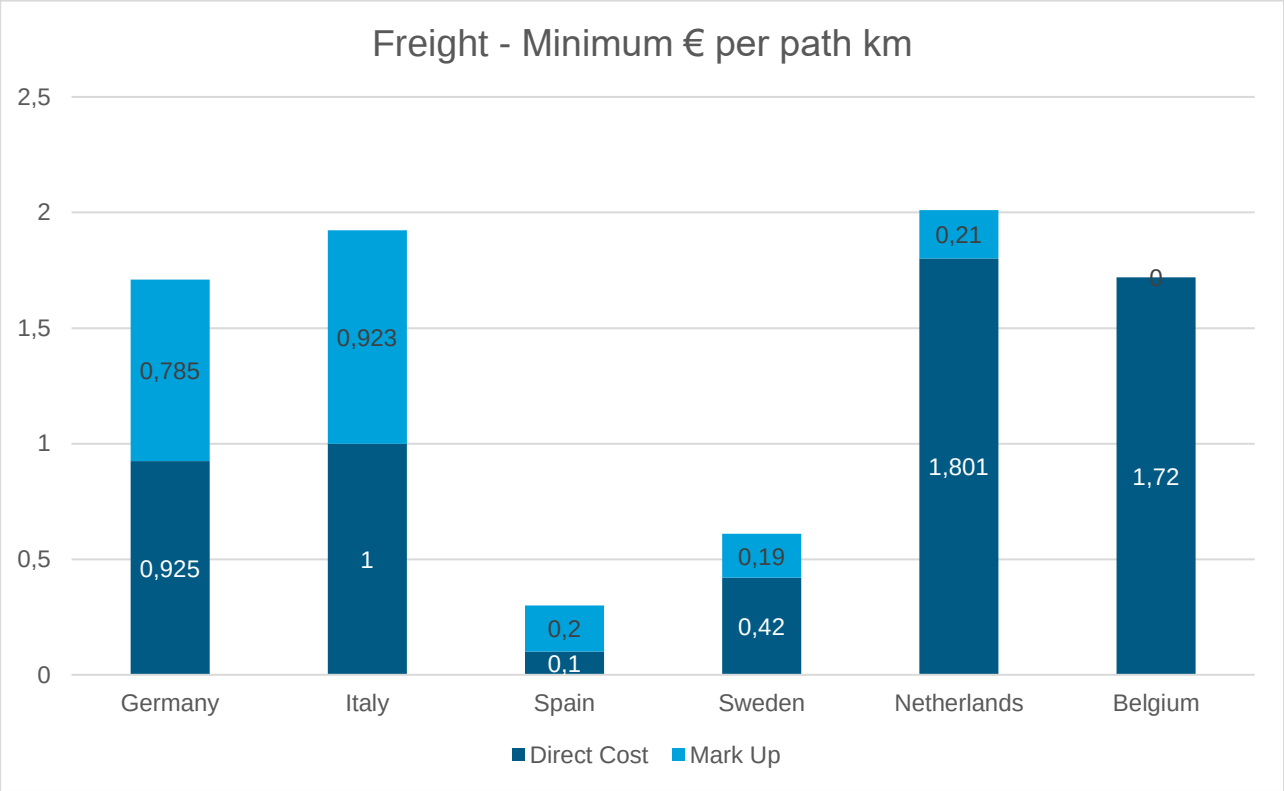
The highest level of total track Access Charge are in Belgium (for the peak hours) and in Spain for the Madrid-Barcelona line with the hypothesis of a train of 900 seats.

2.6.4.2. Summary of Freight Services

For rail freight, TAC is lower than 1 Euros in Spain and Sweden, due to low Access Charge in the component A and in the component B.

The component B is equal to zero in Belgium, while the highest minimum level of TAC for freight services is applied in Italy, with 0.923 Euros for the freight (night) trains.

Figure 2-14 – Minimum EUR per km freight



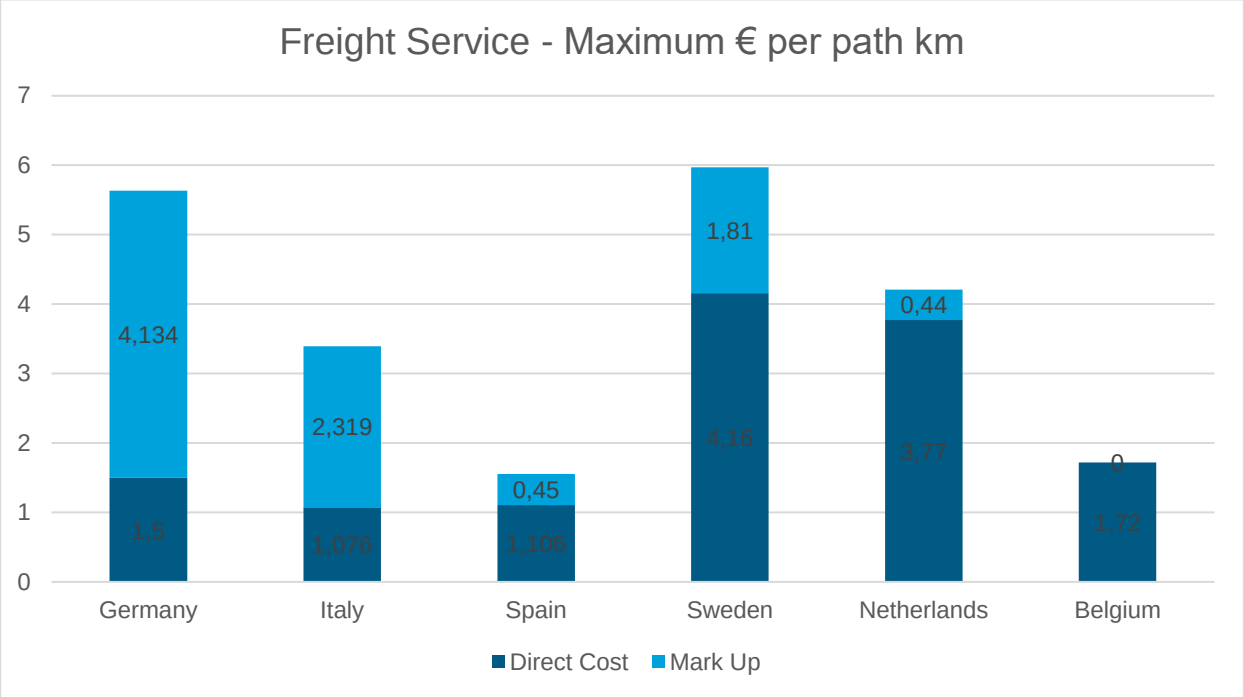
In Netherlands and Belgium, there is a high level for the component A of the TAC, while in Germany and Italy the level is around 1 Euros per train km.

In Sweden there is high variability of the component A related to the weight of the trains, make the Direct Cost component very high.

In the Netherlands, the direct cost component is 1.8 Euros, the highest in the countries analysed.

The Mark Up in the Netherlands is very low and in Belgium is equal to zero.

Figure 2-15 – Maximum EUR per km freight



Sweden has one of the highest levels of TAC for trains with than 4000 tonnes of weight and axle load of 25 tonnes. This is linked to the calculation of the direct cost component that it is strictly related to the weight of the trains and the direct cost in Sweden is 4.16 Euros per train km.

In Germany and Italy, the component B, related to the Mark Up is the higher with a level close to 4.1 Euros per train kilometre in Germany and 2.3 Euros in Italy.

In Italy, there is the lowest level for the direct cost in the case of maximum TAC for freight services.

In Spain there a low level for the rail freight track Access Charge due to a low level of the direct cost and Mark Up.

In the Netherlands the Mark Up for freight services is 0.44 Euros per train km, while in Belgium is zero.

2.7. Capacity allocation

2.7.1. Legislation

The European Legislation does not set out in detail the way that railway infrastructure capacity should be allocated. However, the legislations set out principles for TAC that should apply and there are established methodological protocols.

Fundamental to all EU rail Legislation is that such regulation shall be applied transparently and without discrimination between Railway Undertakings (of the same type). One of the key drivers of the EU primary Legislation was to prevent IMs being pressured politically to favour (former) national Railway Undertakings formally or informally. The Legislation, such as in Ordinance No 41 of 27 June 2001, is clear that it is not enough for Railway IMs to act impartially but they need to follow defined and transparent rules so that they can be seen to act impartially.

According to Article 7 of the European Directive 34/2012 Member States shall ensure that the essential functions, determining equitable and non-discriminatory access to infrastructure, such as decision-making on train path allocation, including both the definition and the assessment of availability and the allocation of individual train paths, are entrusted to bodies or firms that do not themselves provide any rail transport services. Regardless of organisational structures, this objective shall be shown to have been achieved.

According to Article 39 Member States should lay down a framework for the allocation of infrastructure capacity subject to the condition of management independence. Specific capacity-allocation rules shall be laid down. The IM shall perform the capacity-allocation processes. In particular, the IM shall ensure that infrastructure capacity is allocated in a fair and non-discriminatory manner and in accordance with Union law. IMs shall respect the commercial confidentiality of information provided to them.

Inspired by such principles, the Fourth Railway Package was specifically designed to tackle two issues, namely the barriers to market entry and the inefficient administrative procedures that remained in the European railway market.

It is generally understood that to comply with these requirements that IMs need to:

- Formalise their capacity allocation process.
- Ensure that the capacity allocation process does not discriminate between Railway Undertakings – although it may establish a hierarchy of users of the same type (but operating in different markets). For example it is possible to differentiate between passenger operators with a concession agreement and those without such an agreement, subject to having a transparent process and prior regulatory approval.
- Ensure that the process is transparent.
- Secure regulatory approval by the regulator.

The Legislation has been applied differently across Europe. For example, in some Member States the IM have stronger “use it or lose” rights that prevents operators reserving a path without running trains and well stablished procedures that are less well used in other nations. In some other Member States the right to “flex” services during the timetable development process are used more vigorously by the IM than in some other nations. However, such differences are relatively small.

Further details can be found in Appendix section 6.A.4, which discusses how the Capacity Allocations rules operates in Italy, Germany, the Netherlands, Spain, Belgium and Sweden.

2.8. Cross Border Operations

We have carried out a literature review and interviews of Rail Freight Corridor Staff, to understand where Cross Border co-operation exists or rail traffic occurs, and how this is managed.

Within this section commentary is provided on Cross Border operations and four particular cases, where conditions for moving rail services through these areas is explained[12]:

- Rail Freight Corridor North Sea – Baltic.
- Scandinavian-Mediterranean Rail Freight Corridor.
- Øresund link.
- Eurotunnel.

Additionally, we have provided information relating to how IT tools are used on Freight Corridors to improve collaboration.

2.8.1. Cross Border Freight Corridors

Ideally for cross border operations for either passenger or freight services, the first IM that provides the rates for the whole route. This is only possible though for a well understood routes and traffic types, and this is not always the case. For example, Atkins have been involved with a client moving rail services between Poland and France via Germany, and due to the complicated nature of the rail services, the Railway Undertaking did not rely on the first IM. So, each individual IM, for each Member State is responsible for their own pricing.

Countries may come together to coordinate freight services, to formally request a route or routes are designated a Freight Corridor. This process is voluntary only and requires a formal application. EU approval is then required, under EU Directive 913/2010 (Article 13,): which states "The management board for a freight corridor shall designate or set up a joint body for applicants to request and to receive answers, in a single place and in a single operation, regarding infrastructure capacity for freight trains crossing at least one border along the freight corridor (hereinafter referred to as a 'one-stop shop')."

EU Directive 913/2010 relates to the co-ordination of paths/capacity and not the pricing of paths. It states that the 'one-stop shop' is the body responsible for deciding on how capacity should be allocated, but must comply with the capacity allocation regulations set out in EU Directive 2001/14/EC. If a decision cannot be made, EU Directive 913/2010 states that the 'one-stop-shop' shall pass the decision onto the relevant IM.

Critically, on all EU rail Freight Corridors the national IMs retain the exclusive right to decide pricing in accordance with their own nationally approved regulatory process. The two corridors discussed below employ management teams that are able to help railway undertakings through the administrative process and can offer non-binding guidance, but cannot offer TAC contracts for through traffic.

So, in summary, Freight Corridors do not choose the prices, but are meant to optimise capacity allocation to provide optimum paths. Each IM of the individual Member States crossed by the corridor, ultimately charges its own track access price and the end-to-end track access charge is the sum/total of these.

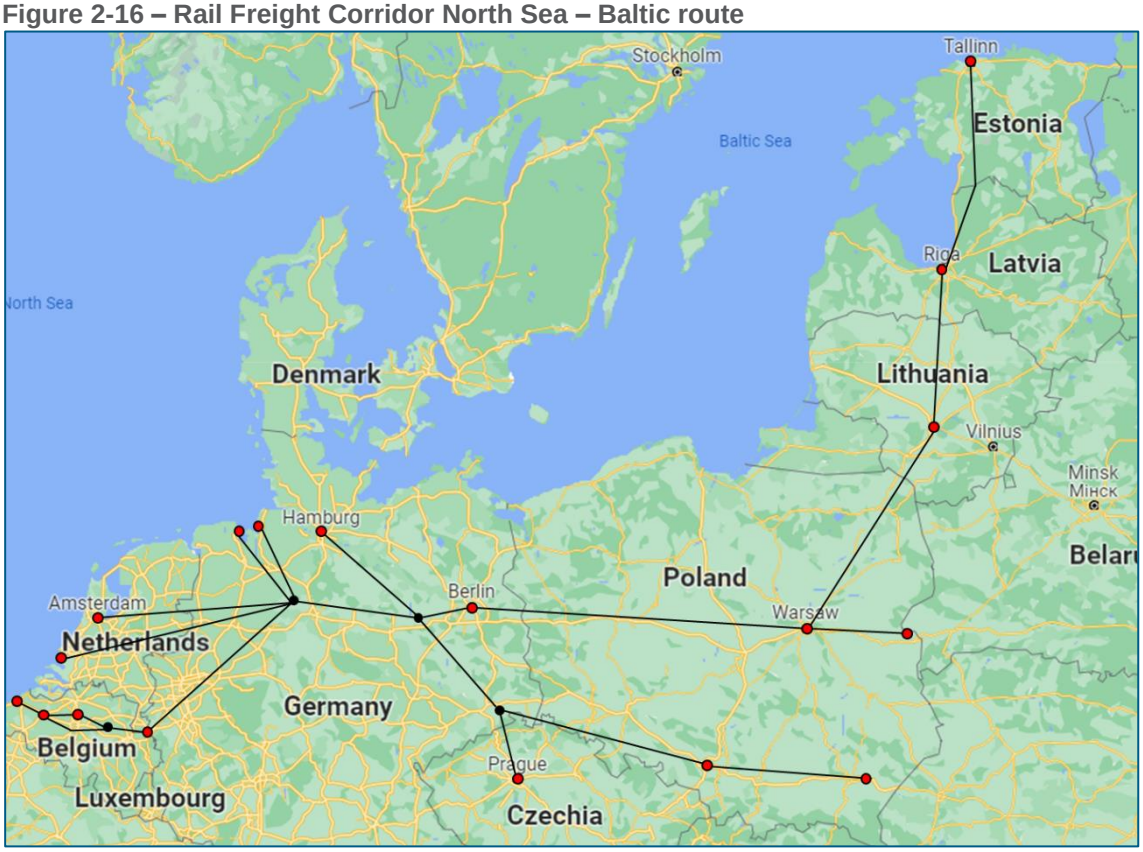
We can see this in the following two examples.

[12] Atkins did consider other cross-border operations, for example, for the provision of high-speed rail services in the Netherlands which, because of the size of the Netherlands, are all international. However, in most cases and in this case no arrangements were put in place to manage the infrastructure internationally. The Netherlands is now served by Eurostar (controlled by SNCF), Thalys (now owned by Eurostar) and DB ICE services. A Dutch operator ("Frya") was formed to operate a high-speed service between the Netherlands and Antwerp and Brussels (in Belgium). This service had to be stopped because of the very low reliability of the rolling stock and because Dutch railways agreed to pay a premium to use the line that was (twice the next nearest bidder and) proved unaffordable. It is understood that TAC rates are relatively consistent across the nations over which Frya operated, however, no attempt was made to agree a single TAC regime prior to the start if services. This is because the high-speed lines in Belgium, Germany, France and the UK were already built so the TAC rates is these countries was already known. The Dutch government paid for the high-speed line and was able to secure an understanding re continued TAC cists in neighbouring countries as part of the business case for the line – and at the same time was keen to offer TAC for the operators who continue to provide a high speed service. Given the failure of Frya and the fact that the Netherlands was built as an increment to existing networks it is unlikely that there are any useful commercial (TAC) models that can be transferred to RB.

2.8.1.1. Rail Freight Corridor North Sea – Baltic

The Rail Freight Corridor North Sea – Baltic is a rail freight corridor that is over 3200 Kilometres long, and spans from Finland to Belgium, travelling through the following countries: Finland, Estonia, Latvia, Lithuania, Poland, Germany, Netherlands and Belgium.

Figure 2-16 – Rail Freight Corridor North Sea – Baltic route



The Rail Freight Corridor North Sea – Baltic has been established in accordance with EU Directive 913/2010. So, this corridor and the agreement is purely about regulations of paths to enable a more efficient operation, and not about setting prices for the usage of a path. This regulation is followed to establish a 'one-stop shop', to allow the collaboration of the different IMs and Regulatory Bodies within the different member states. This in theory allows for better use of track capacity (more optimum paths), higher punctuality (due to increased likelihood of finding an optimum path), better journey times (once again due to the optimum path). Further to this, the collaborative agreement also leads to better coordination at the start/end points of the freight corridors, at locations such as ports.

Such an agreement can also lead to a perception of a more reliable freight service offering to clients, due to a co-ordinated approach of several member states.

The Rail Freight Corridor North Sea – Baltic have a Pre-arranged Paths[13] (PaPs) method for allocating capacity whereby the user (Railway Undertaking/client) is required to provide the specific parameters of their required path (required to provided information such as ad, length or locomotive type). This has to be input by the Railway Undertaking (not the Rail Freight Corridor), into an IT system provided by RailNetEurope. The Freight Corridor then allocates this path on behalf of the IMs.

2.8.1.2. Scandinavian-Mediterranean Rail Freight Corridor

Scandinavian-Mediterranean Rail Freight Corridor is over 7500 Kilometres and spans from Scandinavia to Italy, and passes through: Sweden, Norway, Denmark, Germany, Austria and Italy.

[13] PaPs are dedicated capacity for international rail freight, published in a PaP catalogue on the 2nd Monday of January of each year for the following timetable (11 months before the timetable change). PaPs are defined in accordance with specific parameters such as load, length or locomotive type and are organized and presented in logical geographical sections

Figure 2-17 – Scandinavian-Mediterranean Rail Freight Corridor route

The Scandinavian-Mediterranean Rail Freight Corridor objectives are similar to that of the Rail Freight Corridor North Sea – Baltic, as they are about capacity rather than pricing. Many similarities are present between both corridors, with the Scandinavian-Mediterranean Rail Freight Corridor also allocating capacity through PaPs, whilst using the IT tools provided by RailNetEurope, but the allocation process is still quite long.

2.8.1.3. RailNetEurope

RailNetEurope[14] offers the following IT tools that are used by the two Freight Corridors mentioned above:

- Path Coordination System (PCS) – This is a tool that helps coordinating train path offers and requests. The Railway Undertaking or organisation which wants to book a path is required to input their path request into the system, which is then confirmed by the relevant IM or body. The system also allows the user to understand the paths that may be available.
- Charging Information System (CIS) – This is a tool that provides information on charges for the use of the rail infrastructure from several European networks. The prices presented on this tool are only estimated though, based on the parameters entered into the system (train type, traction type, weight, etc..). The system calculates the estimated charge for each IM, and is able to provide an end to end estimated cost for running a service.
- Train Information System (TIS) – This is a tool that provides real-time information about the running of services and it is used as a source for statistics on punctuality and operational performance.

[14] A non-profit making association founded in January 2004. The aim of this association is to make it easier to access the European rail network and helps improve the performance of services. The majority of its work consists of developing IT systems and assisting with the coordination of different IMs.

2.8.2. Cross border mixed use corridors

We have looked at number of different countries within the literature review to identify mixed use (freight and passenger) railways that are able to operate as international bodies (separate from national IMs) that can charge TAC for international movements. The Øresund link and Eurotunnel as the only two pieces of rail infrastructure which are commonly quoted as cross border operations with a unitary (international) TAC regime. Whilst examining these two cases studies, we found that on closer inspection, they neither works as separate IM but are in fact closer to the commercial operation of a toll bridge. They raise extra charges in the form of TAC on traffic that use the infrastructure. This has required the respective national governments to put in place special legislation. However, once traffic has paid the toll to use the infrastructure is subject to standard national TAC regimes.

2.8.2.1. Cross Border Operation of the Øresund link

The Øresund fixed link (bridge and tunnel) opened for operation on 1 July 2000. The Øresund Konsortiet (OK) is the IM and is an independent contracting entity. The railway line of the link is integrated into the Danish and Swedish railway infrastructure, and OK has agreements for the administration of the rail line with both Danish and Swedish organisations. For Denmark, Banedanmark negotiates with OK, which acts on behalf of A/S Øresund, which is Danish public entity, owned by the Danish State. In Sweden, it is Trafikverket that takes on this role, which is the Swedish Transport Administration and is a government agency, and controlled by the Riksdag and the Government of Sweden. They are responsible for the traffic control, allocation of capacity (slots), contracts on traffic.

Table 2-3 – Cross Border Operation of the Øresund link

Banedanmark (Denmark)	Øresund Link (Cross Border)	Trafikverket (Sweden)
In Denmark, all infrastructure fees are administered by and payable to Rail Net Denmark. For the operation in Denmark the structure of infrastructure charges differs from the ones for passage across the Øresund bridge.	For crossing the Øresund bridge, a Railway Undertaking is obliged to pay a “broafgift” (bridge fee) to Banedanmark (Rail Net Denmark, the Danish rail IM), instead of a kilometerbased-fee, which has to be paid on the other parts of the Danish railway net.	The structure of infrastructure charges differs from the ones for passage across the Øresund bridge. There is a basic fee for track access (minimum access package), a train path fee (split in ‘basic’ and ‘high’ rates, which are for main lines/according to capacity, i.e. supposed to reflect operating costs) and, depending on also specific mark-ups for metropolitan lines (Stockholm, Göteborg, Malmö).
Trains are charged a fee of 5.13 DKK per km (ex. VAT). Infrastructure charges are independent of geography or time. Freight trains are also subject to a diesel or el-fee (depending on the locomotive). For an el-locomotive the fee is 16.86 DKK/km and for a diesel-locomotive: 3.24 per liter diesel. All ex. VAT. to compensate for these additional charges, an environmental Network Grant is paid ex post, which as pr. 1 January 2022 was 0.0144 DKK per ton freight transported (excl. VAT).	The fees for the use of the Øresund bridge are per train and (for 2021) are on the Danish part (excl. VAT): a) Passenger train: 2.2.94,74 DKK/train, b) Freight train: 2776,57 DKK/train. On the Swedish part of the Øresund bridge (excl. VAT): a) Passenger trains: 0.0180 SEK per tonne/km (axle-load <=17t), 0.0197 SEK per grossetonnekm (axle-load >17 t) b) Freight trains: 3.183 SEK/train*	The basic Track Access Charge is calculated per grosstonnekm, at 0.0180 SEK per grosstonnekm (axle-load <=17t), 0.0189 SEK per grossetonnekm (axle-load >17 t). The corresponding charges for freight trains are 0.0105 SEK per grosstonnekm (axle-load <=10 t), 0.0117 SEK per grosstonnekm (axle-load above 10 and up to 17 t), 0.0128 SEK per grosstonnekm (axle-load above 17 and up to 27 t), and 0.0138 SEK per grosstonnekm (axle-load >25 t).+ The train path fee is calculated per trainkm. The basic rate is 3.78 SEK/train km (both passenger and freight trains) and the high rate 8.00 SEK/train km for freight and service trains and 9.00 SEK/train km for passenger trains. On top of that, there is a general passage fee for passenger traffic and service trains in the Stockholm, Göteborg, and Malmö area of 433 SEK per train.
	*Trafikverket (2021), Network statement 2023, deliveries as of 11 Dec. 2022.	+Network statement for 2022 (https://www.trafikverket.se/contentassets/42ea7ef929ce45738558e401eee2f4a6/ns_2022_2021-12-02.pdf)

2.8.2.2. Cross Border Operation of Eurotunnel

The Eurotunnel connects the UK to France beneath the English Channel, with the IM being Getlink; a France-based public company. The rail services comprise of High-Speed and freight services. The tunnel connects end-to-end with the High-Speed railway lines of the Lignes à Grande Vitesse (LGV) in France and High-Speed 1 (HS1) in the UK. This composition of the route can be seen in the figure below, where the Euro Tunnel connects to two different IMs; HS1 (Privately owned) in the UK, and SNCF Réseau (Currently state run) in France.

Figure 2-18 – European Legislation

Each IM has a different set of charges for services, and also charge in a different way, this can be seen in the table below.

Table 2-4 – Cross Border Operation of Euro Tunnel

<table>
<tr><th>HS1 (United Kingdom)</th><th>Euro Tunnel (Cross Border)</th><th>SNCF Réseau (France)</th></tr>
<tr><td>Fixed charge (IRC) per train based on £/min rate of a 31 minute between London St Pancras and the Euro tunnel boundary. Additional charges for various additional elements associated with OMR that are charged on a £/Train KM, or £/Train Minute</td><td>Fixed charge per Reserved Weekly Train (RWT), Reserved Individual Train (RIT), Ad-hoc Train (AHT) or Empty Coaching Stock (ECS) path based on time of day operated (Off-Peak, Intermediate Period, Peak and Maintenance Period), plus a charge of €17.93 (which is 10 to 20k Euros per train) per passenger carried on each train.</td><td>Variable charge per train, the Redevance de Marche (RM) based on €/km rate for access to the LGV (High-Speed rail) network and also for the provision of electricity for traction. Different €/km variable rates apply to each of the LGV lines in France, but the electricity costs are split as Redevance de Circulation Electrique (RCE) and Redevance pour le transport et la distribution de l’énergie de traction (RTCE-A)</td></tr>
<tr><td><table>
<tr><td>IRC £/min*</td><td>£69.57</td></tr>
<tr><td>OMRCA1 £/km#</td><td>£3.94</td></tr>
<tr><td>OMRCA2 £/min#</td><td>£11.87</td></tr>
<tr><td>OMRCB £/min#</td><td>£28.05</td></tr>
<tr><td>OMRCC £/min#</td><td>£10.03</td></tr>
<tr><td>Additional IRC £/min^</td><td>£0.85</td></tr>
</table></td><td><table>
<tr><td></td><td>RWT</td><td>RIT</td><td>AHT</td></tr>
<tr><td>Off Peak</td><td>€3965</td><td>€4361</td><td>€4559</td></tr>
<tr><td>Intermediate</td><td>€4405</td><td>€4846</td><td>€5066</td></tr>
<tr><td>Peak</td><td>€4846</td><td>€5330</td><td>€5573</td></tr>
<tr><td>Maintenance</td><td>€6608</td><td>€7269</td><td>€7599</td></tr>
</table></td><td><table>
<tr><td>RM</td><td>€15.04 - €16.77+</td></tr>
<tr><td>RTCE- A €/km</td><td>€0.232</td></tr>
<tr><td>RCE €/km</td><td>€0.307</td></tr>
</table></td></tr>
<tr><td>* At 2009/10 prices
At 2018/19 prices
^ At 2015/16 prices and subject to Price Indexing (RPI in the UK)</td><td>There is also an Administration Charge of €7,500 per contract
Charges as at Jan-2020 and subject to Price Indexing (RPI in the UK)</td><td>Charges as shown in the 2022 SNCF service schedule
+ Dependant on type of train.</td></tr>
</table>

2.8.2.3. Lessons for Rail Baltica project

The arrangements that have proved simplest to introduce have been the pre-designation of paths for freight – that is the creation of PaPs. It is therefore recommended that the timetablers allocate capacity and slots within the emerging timetable for freight – ideally in coordination with the Polish IM and Rail Freight Corridors 5, 8 and 11 – so that freight railway undertakings can have greater confidence about the quality and quantity of rail freight paths and how they will connect across Europe. Firming up the allocation of capacity for freight in this will reduce the flexibility for passenger traffic because of the need to define that capacity, but that will only assist passenger railway undertakings bidding for capacity to operate their services.

The arrangements for the unified charging of passenger and freight services have only limited application. This is because whilst bi-lateral arrangements have ensured that a common charge is applied for the common cross-border infrastructure this is effectively simply a toll designed to help recuperate the cost of the cost of that infrastructure and is not coordinated with TAC rates that RUs have to pay for access either side of the Oresund bridge or the Channel Tunnel.

2.8.2.4. ULTC

Atkins also investigated the coordinated freight offering from ULTC, although outside of the EU. UTLC is owned jointly by the railways of Belarus, Russia and Kazakhstan. UTLC is able to offer end to end combined rates to freight forwarders and operators for traffic between China and parts of Europe. It hauls around 15 trains per day at an average of 950 km per day. It is understood that revenues are shared between the railways of Belarus, Russia and Kazakhstan according to a pre-agreed formula. The biggest benefits of the UTLC are that (1) customers do not have to negotiate with the railways of Belarus, Russia and Kazakhstan separately and the railways of Belarus, Russia and Kazakhstan do not need to worry that any rates agreed are discriminatory. Unfortunately, the model used cannot be applied to Rail Baltica. The UTLC arrangements for combined haulage and TAC (and other fees). Whilst third party operators can book block trains, they cannot operate train service over the railways of Belarus, Russia and Kazakhstan in return for payment of a TAC. The huge distances involved mean that shipping is the only modal competition to rail. That will not be the case in the Baltics where highway operators will be able to compete more effectively especially over shorter distances.

2.9. Summary/Benchmarking

A summary table, which benchmarks the six countries analysed in this study are presented in the table below.

Table 2-5 – Summary benchmarking table

		Italy	Germany	Netherlands	Belgium	Spain	Sweden
Network description	Kilometres	18475	39379	3055	3602	15392	10899
	Electrified route length (KM)	12936	20920	2310	3160	9819	8185
	HSR network (KM)	963	1104	87	261	2780	0
	Trains per day per route km for freight services	7.2	18.5	10.0	10.0	4.6	9.1
	Trains per day per route km for passenger services	49.4	59.6	137.4	65.8	29.8	31.9
	Trains per day per route km for total services	56.6	78.1	147.5	75.8	34.4	41.0
	Infrastructure Owner	RFI, FerrovieNord and others	DB Netz AG and regional network	ProRail	Infrabel	ADIF and regional network	Trafikverket
	Passenger service contract types	Open Access for HSR and international services, PSO for regional services. Long distance services direct awards.	Open Access for HSR and international services, PSO for regional services.	Open Access for HSR (monopoly de facto) and international services, PSO for regional services.	Open Access for HSR (monopoly de facto) and international services, PSO for regional services.	Tender process for HSR, PSO for regional services	Open access
	Freight service contract types	Open access	Open access	Open access	Open access	Open access	Open access
Access charging methodology (Euro/KM)	Does IM charge Direct Costs	Yes	Yes	Yes	Yes	Yes	Yes
	What is direct charge range	0.58-1.47	0.71-1.5	0.81-3.77	1.72	0.1-3.79	0.23-4.56
	Direct charge range for passenger Rail	0.268-0.795	0.714-1.146	0.81-1.81	1.72	0.725-1.97	0.23-0.84
	Direct charge range for passenger High-Speed Rail	1.23-1.474	1.146	1.29-1.801	1.72	3.78	//
	Direct charge range for freight Rail	1-1.076	0.925-1.5	1.801-3.77	1.72	0.1-1.106	0.42-4.16
	Does IM charge specific network Access Charge?	Yes	Yes	Yes	Yes	Yes	Yes

		Italy	Germany	Netherlands	Belgium	Spain	Sweden
	Does IM charge supplemental charge for new infrastructure	No	No	Yes	No	No	Yes
	Does IM have a Capacity Charge	No	No	No	No	No	Yes
		However, a capacity charge exists in Austria, Luxembourg, Estonia (and GB).					
	Does IM have a Volume based charge	No	No	No	No	No (Yes in the past)	No
	Does IM have charge/discount for environmental factors	Yes	No	No	No	No	Yes
	Does IM charge extra for electric charges	Yes	Yes	Yes	Yes	Yes	Yes
	Does IM charge for Mark Up	Yes	Yes	Yes	Yes, only in passenger	Yes	Yes
	Range of Mark Up for conventional passenger rail	1.17-3.41	2.462-5.874	0.08-0.35	0.13-8.64	0.512-3.74	0.19-1.28
	Range of Mark Up for freight rail	0.923-2.319	0.785-4.134	0.21-0.44	0	0.07-0.45	0.19-1.81
	Range of Mark Up for HS passenger rail	4.023-5.89	11.864-13.864	12.503-12.609	1.92-19.94	5.27-17.57	//
	Range on Mark Up	0.92-5.89	0.78-13.21	0.1-12.61	0.13-19.94	0.2-20.44	0.19-1.81
Track Access Charging Cost (Euro/KM)	Track Access Charges for total services (MAP)	3.00	4.51	2.16	7.84	5.77	1.10
	Track Access Charges for freight services (MAP) (Average)	3.32	5.40	2.12	8.62	6.62	0.97
	Track Access Charges for passenger services (MAP)	0.82	2.91	2.77	2.71	0.23	1.55
Network Grant	Is there a Network Grant to IM or operators	Yes	Yes	Yes	Yes	Yes	Yes
	Is there a direct to Network Grant to IM	Yes	Yes	Yes	Yes	Yes	Yes
	Network Grant to the IM per 1000 passenger-km	138	165	127	233	187	110

		Italy	Germany	Netherlands	Belgium	Spain	Sweden
Capacity allocation Rules	**Passenger Services**	85% of capacity allocated in the framework agreement International services, Commuter and HSR priorities	Passenger and freight that are integrate services have the same priority	Coordination process needed	HS services has priorities in the mixed uses on passenger services	70% capacity allocated in framework agreement for HS. Tender procedure for that allocation of capacity in the competitive HS scenario	Efficient use of the capacity and prioritisation in function of Annex 4 of IM
	Freight Services	No priorities	Freight train has lowest priorities except when there are integrated network services	Coordination process needed	Rapid services have priorities on slow freight services	No Priorities	Priorities in function of the socio-economic impact
	Prioritisation of Services	Regional passenger services in the peak hours	Priority for Regular-interval or integrated network services	"Transport takes precedence over traffic" and some prioritisation for some routes	Priorities in function of typology of the line	Exclusive use of infrastructure of some specific services (HSR), RFIG and international services	Methods of calculation with socio-economic benefits analysis

The table below shows how different countries compared to each other in terms of what factors are attributed to direct cost.

Table 2-6 – Comparison of different countries for freight services – Direct Cost

Freight Services						
	Italy	**Germany**	**Netherlands**	**Belgium**	**Spain**	**Sweden**
Axle load	No	No	No	No	Yes	Yes
Dangerous goods[15]	No	No	No	No	No	No
Part of network	No	No	No	No	Yes	Yes
Speed	Yes	Yes	No	No	Yes	No
Track parameters	No	No	No	No	Yes	No
Traction Power	Yes	No	Yes	Yes	No	No
Train Mass	Yes	Yes	Yes	No	Yes	Yes

[15] Amongst the sample nations chosen there is no differentiation, but different approaches are allowed by EU legislation and take place. In Finland and Portugal, the carriage of dangerous goods is subject to a specific procedure/study that generates a permit, and this permit is chargeable. However, the charges for these roughly reflect the extra Direct Costs, All freight traffic is subject to a potential Mark Up subject to the ability of that market to afford such a premium so there is no incentive for dangerous goods permits to be higher than the perception of the extra costs of the carriage of such traffic.

Table 2-7 – Comparison of different countries for passenger services – Direct Cost

	Passenger Services					
	Italy	**Germany**	**Netherlands**	**Belgium**	**Spain**	**Sweden**
Axle load	No	No	No	No	Yes	Yes
Dangerous goods	No	No	No	No	No	No
Part of network	No	No	No	No	Yes	Yes
Speed	Yes	Yes	Yes	No	Yes	No
Track parameters	No	No	No	No	Yes	No
Traction Power	Yes	No	Yes	Yes	No	No
Train Mass	Yes	Yes	Yes	No	Yes	Yes

There is only one differentiation between both passenger and freight, with that being for the Netherlands, where speed is not a factor for freight services, but is for passenger services.

2.10. Multi Criteria Analysis Oriented Approach

Within this section we set out a Multi Criteria Analysis (MCA) to help understand how different TAC scenarios can affect criteria. These scenarios and criteria are presented below.

2.10.1. Scenarios

The MCA is based on three scenarios:

- High TAC rates, with a high level of the Mark Up – to provide revenue for the IM, such that they ideally breakeven financially.
- Market-orientated TAC rates – with the aim of maximising GDP. This results typically in medium TAC rates.
- Low TAC rates – Government support to reduce TAC rates towards Direct Costs only, in order to maximise the environmental benefits.

In building scenarios for testing suitable for RB, it should be borne in mind that the regimes in each country often have unique elements and do not fit neatly into distinct classifications. In reality most nations that use TAC sit on a spectrum between high TAC rates and low TAC rates, but even this can vary between passenger and freight. Nations also can change over time, for example, the UK used to provide no direct support to the IM, with an objective they could be financed from almost wholly from TAC revenue. But, altered this policy and now provides significant direct grant funding to the IM in order to reduce the TAC rates charged to passenger RUs. In Belgium, passenger TAC rates are very high, with the objective of maximising IM revenue, but freight is charge at Direct Cost only.

In the table below, we have set out roughly, where nations included in this MCA sit in this spectrum. It is worth noting that some nations outside of the shortlisted nations used in this comparative assessment can also be tested in this way. Typically, the existing IMs of the nations of the Baltic States have high TAC rates and would be at that end of the spectrum, and in the high TAC scenario.

2.10.2. Criteria

For these scenarios, the following criteria have been selected:

- Revenue (for IM).
- Traffic (Trains per day per route km - to be split between HS Passenger, other passenger, and freight).
- Added value/prioritisation (prioritise for added value).
- Transparency (of Railway Undertaking service approval and capacity allocation process).
- Beneficial environmental Impact.
- Freight-tonne-km / GDP (and growth of freight-tonne-km).
- Economic contribution of railway to GDP.
- Openness to competition.

The following table provides a “scoring” of importance for each criterion to each scenario, (NB: The figures are based on a qualitative, rather than quantitative assessment). The scoring is set between 1 (low) and 10 (high).

Table 2-8 – Multi Criteria Analysis - Probable Relevant Impact of Each Scenario

	Scenarios		
MCA Criteria	**High TAC**	**Market Orientated TAC**	**Low TAC**
Country Examples	BE	DE, IT, ES, NL	SE
Aim of TAC regime	To provide revenue for the IM, such that they ideally breakeven financially	Maximised GDP	Government support to reduce TAC rates towards Direct Costs only, in order to maximise the environmental benefits
RU Revenue	1	7	9 (some trains may suffer from shortage of capacity due to low TAC)
IM Revenue	6 High TAC reduces traffic and thereby TAC revenue	7 Complexity of pricing makes maximising revenue v hard	3 All TAC above Direct Costs contributes to fixed cost base of IM
Traffic Intensity (measured as train per km)	3	5	10
Added value/Prioritisation	3	9	2
Transparency	9	4	7
Beneficial environmental Impact	1	5	10
Passenger-km per capita	1-5	3-7	6-10
Economic contribution to GDP	3	10	7 (some traffic will run, which may not be economically advantageous)
Freight-tonne per GDP	1-3	3-7	6-10
Openness to competition	1	8	9

In the benchmark analysis we were able to identify all these scenarios for the Countries analysed, which are presented in the table, an explanation of how these countries fit these scenarios is explained further on.

Some of the criteria needs to be independent from the scenarios. Prioritisation of the traffic is related to the added value of the traffic or policy targets and it is not dependant from the level of the TAC.

The tables below explain why the level of importance has been set for each scenario.

Table 2-9 – High TAC, scoring explanation

High TAC		
MCA Criteria	**Score**	**Reasoning**
RU Revenue	1	High TAC result in the IM not being as reliant on revenue to cover their costs.
IM revenue	6	High TAC discourages traffic
Traffic Intensity (measured as train per km)	3	High TAC result in the IM not having a lower reliance on traffic intensity to cover their costs.
Added value/Prioritisation	3	Less prioritisation is given in terms of valuating different types of services, as the priority is placed upon charging a higher TAC.
Transparency	9	With a higher TAC cost, it is important to be transparent with customers as to who and what type of service is charged at.
Beneficial environmental Impact	1	Little incentive is given, as the priority is to charge high TAC.
Economic contribution to GDP	3	High TAC may not necessarily be set up to incentivise these factors, as the focus is on charging high levels of TAC. The TAC regime is likely to be set up to recover cost, without a focus on externalities.
Freight-tonne per GDP	1-3	
Openness to competition	1	High TAC does not lend itself to competition, as the regime is unlikely to be focused on attracting services, but rather focused on recovering cost.

Table 2-10 – Market Orientated TAC, scoring explanation

Market Orientated TAC

MCA Criteria	Score	Reasoning
RU Revenue	7	Revenue becomes an important factor, as the Mark Up will be set lower, with a reliance on revenue to make for this lower Mark Up.
IM revenue	7	Complexity of market means high TAC risks “pricing off” some traffic (because TAC unaffordable)
Traffic Intensity (measured as train per km)	5	This factor has a mid-level of importance, as this does not necessarily help an IM recover its costs.
Added value/Prioritisation	9	This is an important factor, as priority can be given to services that will generate revenue, or fill a policy need.
Transparency	4	Transparency is not as important as the level of TAC that is deemed acceptable to RUs.
Beneficial environmental Impact	5	This has a mid-level of importance as it depends on what the market is offering.
Economic contribution to GDP	10	Pricing relates to market value
Freight-tonne per GDP	3-7	This has a mid-level of importance as it depends on what the market is offering.
Openness to competition	8	This is an important factor, as level of TAC are set to a market level.

Table 2-11 – Low TAC, scoring explanation

Low TAC		
MCA Criteria	**Score**	**Reasoning**
RU Revenue	9 (some trains may suffer from shortage of capacity due to low TAC)	Reliance on Revenue is important as the Mark Up will be low, so the IM may be reliant on revenue to cover costs.
IM revenue	3	All traffic above Direct Costs contributes to IM fixed cost base
Traffic Intensity (measured as train per km)	10	With low TAC, a high intensity can help recover costs.
Added value/Prioritisation	2	With low TAC, the priority can be on the number of services rather than the type of services to recover cost.
Transparency	7	With a low TAC, it is important to be transparent with customers and the taxpayer as network grants may be higher, so understand where these are attributed to is important.
Beneficial environmental Impact	10	This is an important factor, as Low TAC should result in policy and incentive schemes to priories the environment.
Economic contribution to GDP	7	Some traffic will run, which may not be economically advantageous
Freight-tonne per GDP	6-10	This can be an important factor, as low levels of TAC should attract freight to boost cost recovery and economic contribution.
Openness to competition	9	Low TAC may result in RUs showing a greater of level of interest in running services.

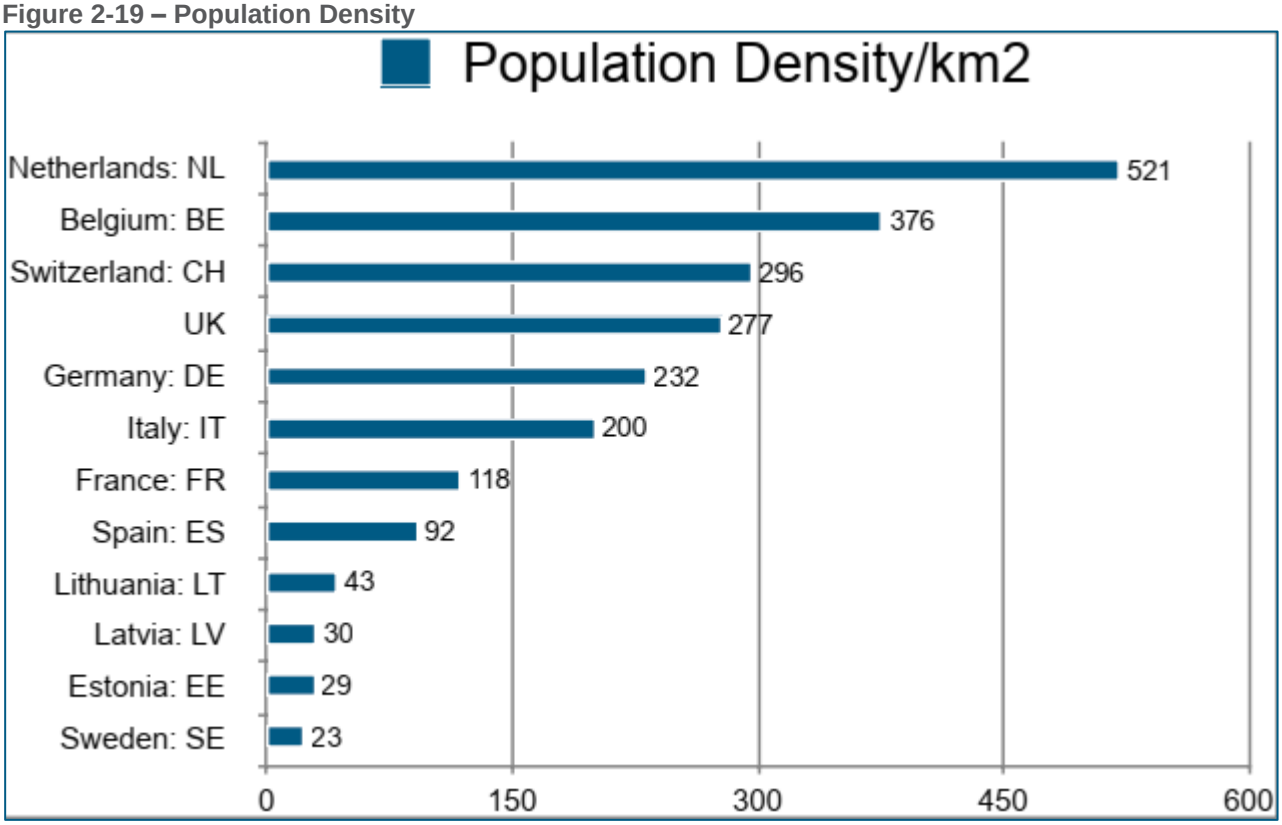
2.11. Should the Baltic States follow Sweden's Example?

We believe that Sweden presents an interesting case in which the Baltic states may wish to follow.

2.11.1.1. Background

Population density is an important factor to consider, as population density can have a significant impact on what level of traffic intensity is possible for railway's operation. The wide differences in the population density of European countries listed in the figure below, demonstrate why this is such an important factor.

Figure 2-19 – Population Density



It will be clear that countries such as the Netherlands, Belgium and Switzerland have a far better chance of operating passenger railways at far higher intensities (higher traffic volumes) than countries in Iberia, Scandinavia and Baltic countries. Germany, Italy and France occupy the middle ground.

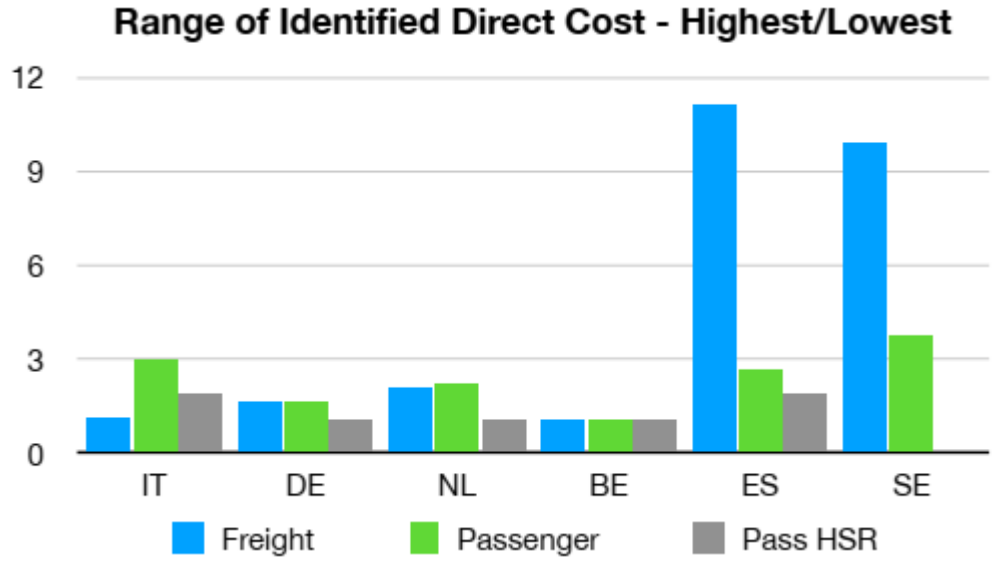
The hypothesis that the Baltic countries would be likely to face similar issues to those of Sweden is therefore one that is worth investigating.

2.11.1.2. Axel Loads and Environmental Factors

Only Sweden and Italy take environmental factors and high axle loads into account when setting TAC rates, while only Sweden allocates capacity (and sets TAC rates) based on socio-economics analysis. These two countries (and the UK) set track charges and any PSO subsidy based on a market- oriented approach.

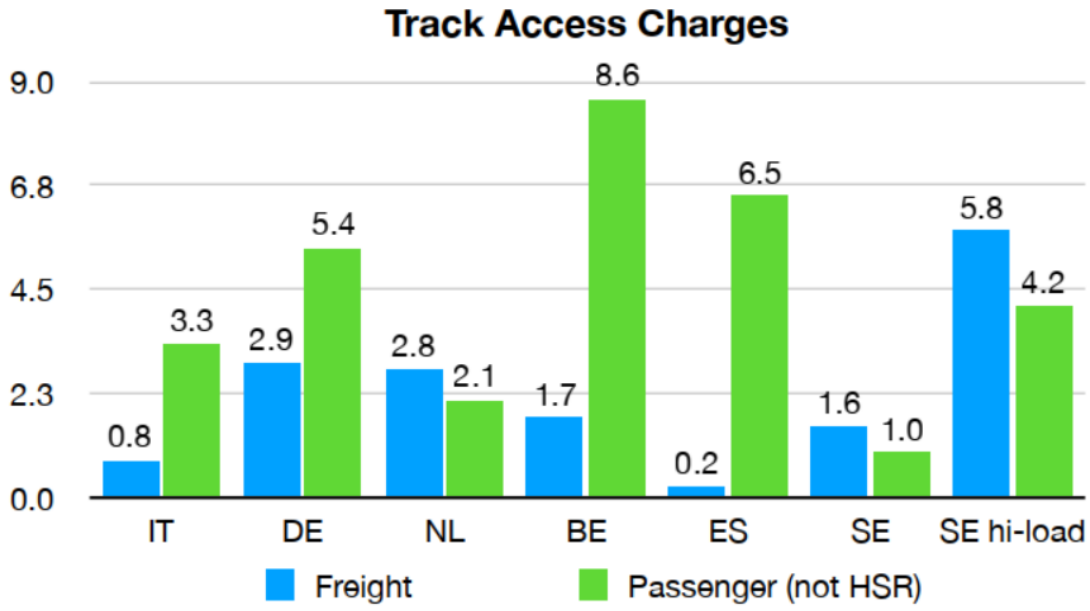
Only, Spain and Sweden, have identified a wide variability of direct cost dependent on such issues as high axle loads or differential parts of the network, as the figure below shows.

Figure 2-20 – Ratio of highest direct cost to lowest direct cost



The advantage of such precision of cost accounting is that it enables the IM to identify if a specific bid for an open access service exceeds the variable cost of providing access to the network. As Horngren's Advanced Cost Accounting describes, it is beneficial to a producer (here the IM) to supply all additional services that make a contribution over and above their relevant variable costs up to a maximum of the practical capacity ofthe route. Having a better knowledge of the cost impact of such a service enables an IM to lower its TAC levels to a level at which they will attract additional services. In this context, we do not have data for the high axle load TAC premiums for Sweden, but it is likely that they will be as shown in Figure 2-21 and that Sweden's low TAC rates for standard freight traffic would result in higher traffic volumes, especially for freightbut also passengers, than one would expect from a low population density country.

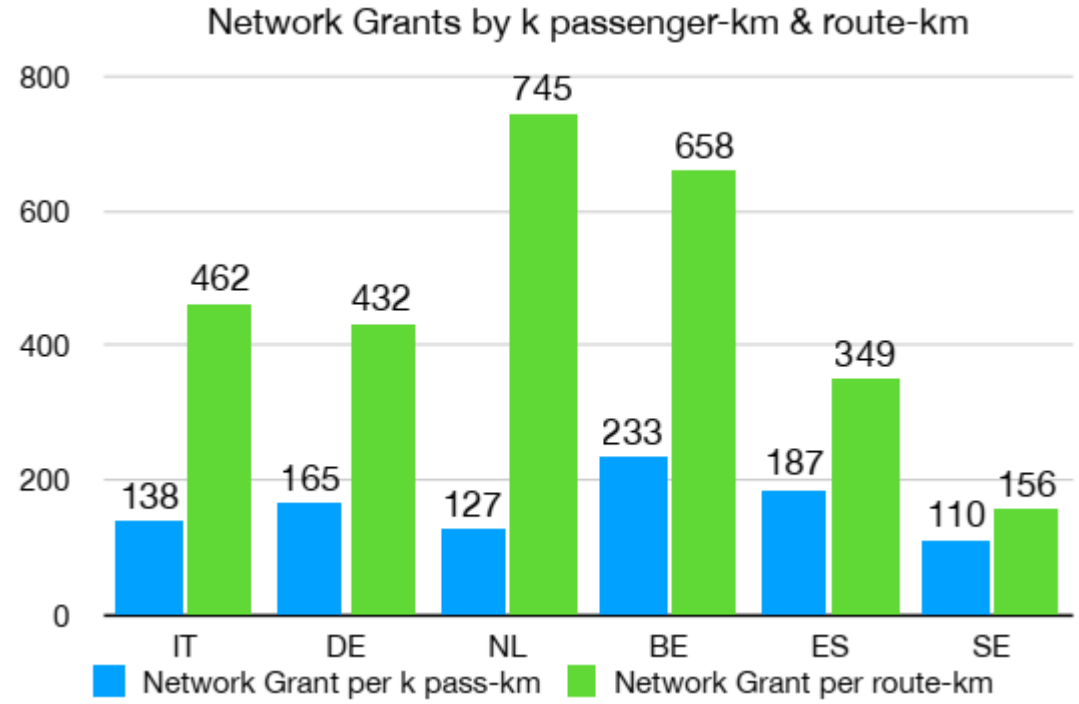
Figure 2-21 – Track access charges (SE weight & axle hi-load premium)



2.11.1.3. Levels of Network Grant

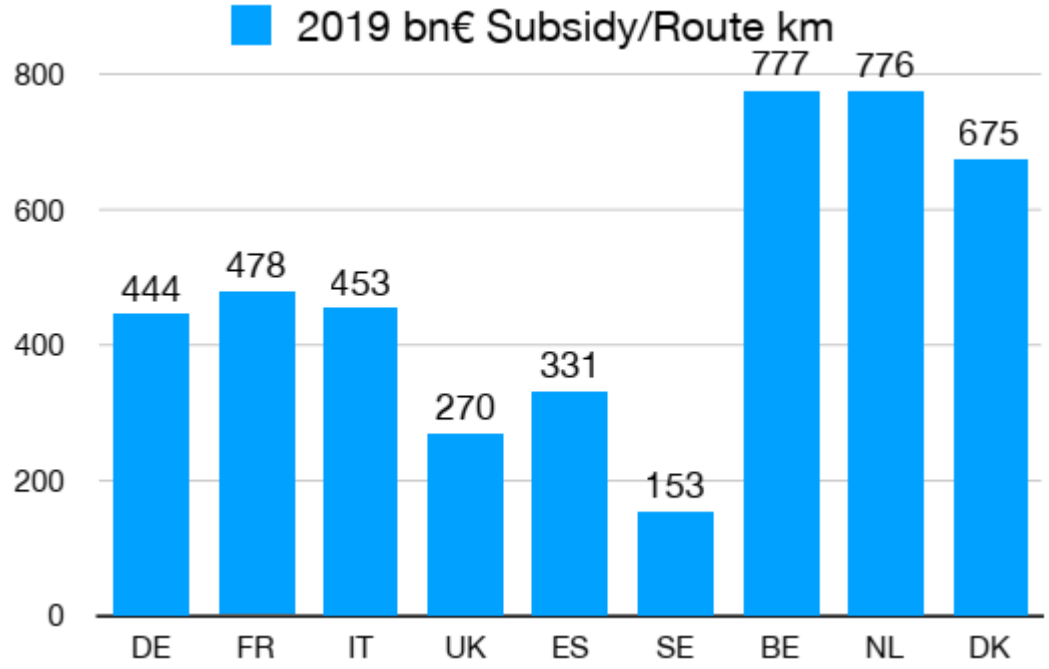
Although in theory, a high Network Grant is intended to enable an IM to charge a lower level of TAC (or is the legal justification for doing so), this link does not apply in reality, indeed the contrary is the case - the Belgian and Netherlands TAC levels are among the highest, while they also receive the highest IM Network Grants.[1] Conversely, the Swedish TAC levels are among the lowest, while they also have the lowest Network Grants.

Figure 2-22 – Network Grants per k passenger-km and by k route-km



Sweden's total net Network Grant per route km - including both IM and RU Network Grants or premiums - is also considerably lower than other countries. The efficiency of the IM could be pushed by the pressure of the competition of the Railway Undertakings. The same applies to the UK, the other country with almost all train operating services open to competition, as the figure below shows.

Figure 2-23 – Total 2019 railway subsidy (IM+RUs) by k route-km - 2019 pass-km figures used except for Belgium (2017) and Netherlands (2018)



2.11.2. Discussion for each Country

2.11.2.1. Sweden

Sweden's transport policy is guided by a national political consensus that is highly favourable to rail, as we have seen, its Network Grants given to the infrastructure manager (adopting the criterion of Short Run Marginal Cost) are among the lowest, but by adopting a market-oriented, low TAC approach and with good knowledge of its RU clients, it has been able to justify of grants to rail operators under the environmental scheme accepted by the European Commission in 2020.

These are in fact lower than any other railway both per passenger-km and per route-km, but the market orientation and openness to competition has led to much higher success in terms both of passenger-km per capita and tonne-km per route-km. It also operates more freight trains per day per route km than any but the relatively dense population countries.

The effect of this policy on the TAC might theoretically be expected to be a lower level of revenue for the IM,but because the level of TAC for Railway Undertakings in Sweden is lower than in other countries, which gives a greater incentive among all Railway Undertakings to generate a higher level of traffic, the revenue is sufficient to result in a lower need for Network Grants. (Pre-Covid, this was also the case in the UK.)

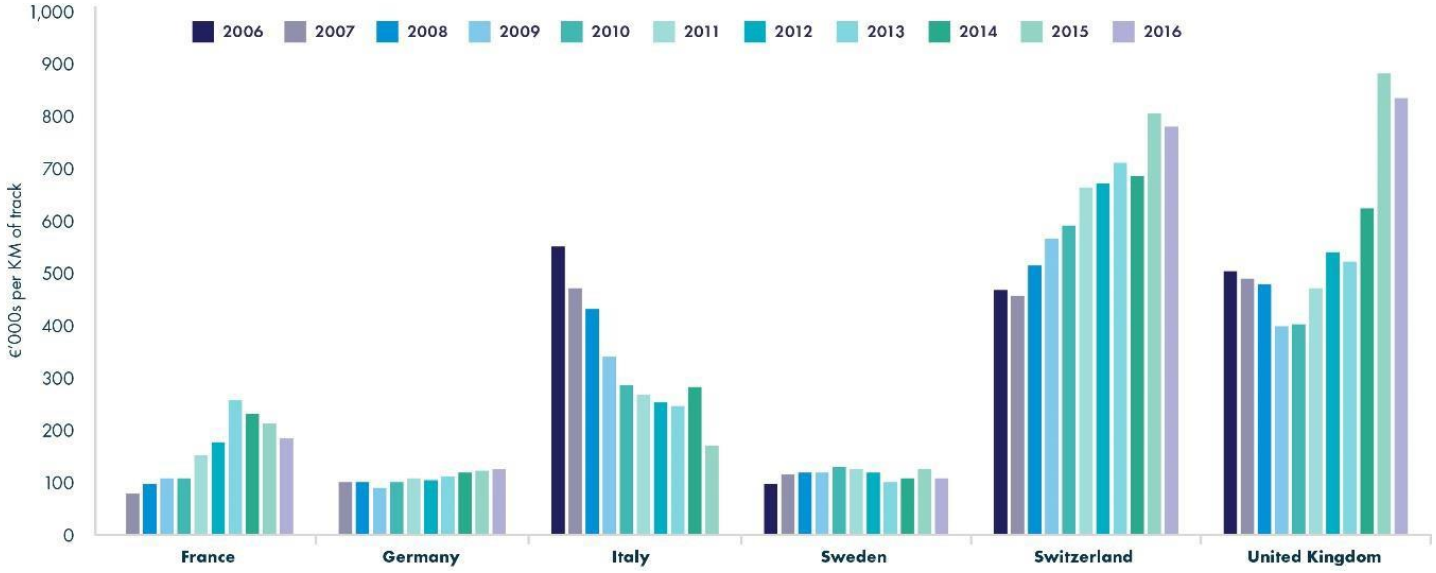
The fact that the IM receives Network Grants might theoretically risk a rise in the Total Efficient Cost, but with the right incentives this will not take place and indeed, we have seen above, by comparing figures 8.2 and 8.3, that European experience shows that it does not. What it does mean is that the incentive for the IM to improve efficiency must be driven by key performance indicators and cost governance, rather than low revenue or cash flow.

According to Figure 2-22 and Figure 2-23, we see that Sweden's network and overall subsidy were both the lowest out of 9 of Europe's largest railways.

So, neither direct grants nor high TAC rates determine the absolute amount of railway subsidy. Indeed, if the intensity of network use rises sufficiently, even with lower TAC rates, it can result in just as much revenue, whereas a high level of TAC may well be an entry barrier for new entrants and prevent competition.

What is also very important in terms of keeping the amount of subsidy in check is a moderate but sustained investment in infrastructure, but with good cost governance and control. In the period 2006-2016, Sweden was spending at about the same rate as Germany, but much less than Italy, Switzerland or the UK.

Figure 2-24 – Expenditure on infrastructure in rail per KM of track 2006-2016

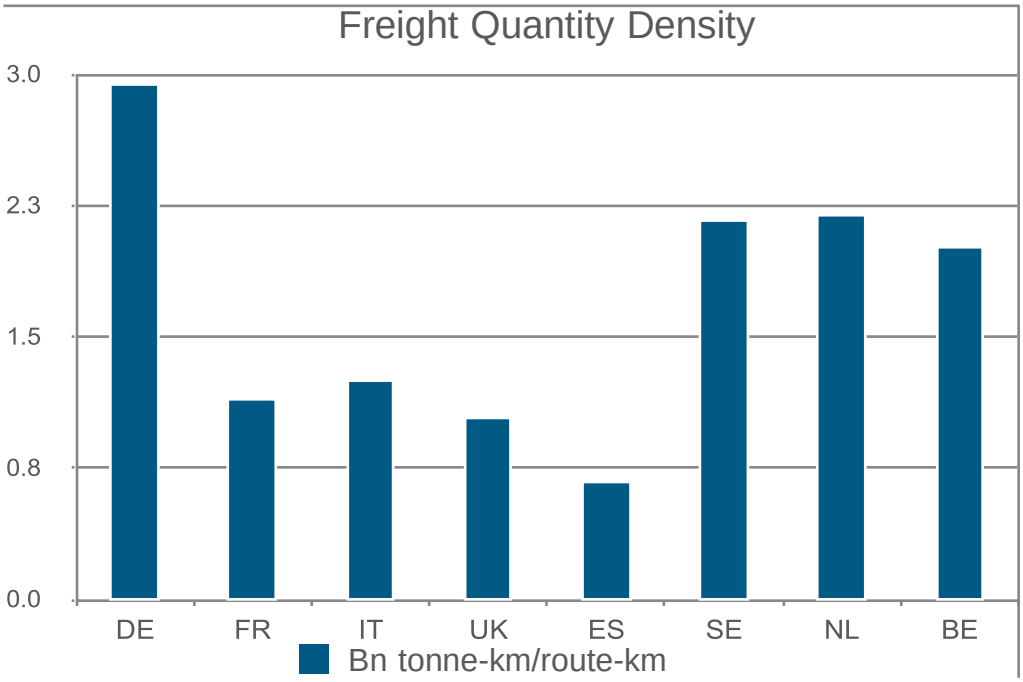


Thanks to its low level of Track Access Charges and its policy of tendering out services to the private sector, Sweden is one of the most liberalised countries for both passenger and freight traffic.

This is the primary reason why among the larger countries, Sweden has a higher route density for rail-freight in terms of tonne-km per network route-km than Italy, France and Spain. Only Germany, Switzerland and the Netherlands are higher, as the figure below shows:

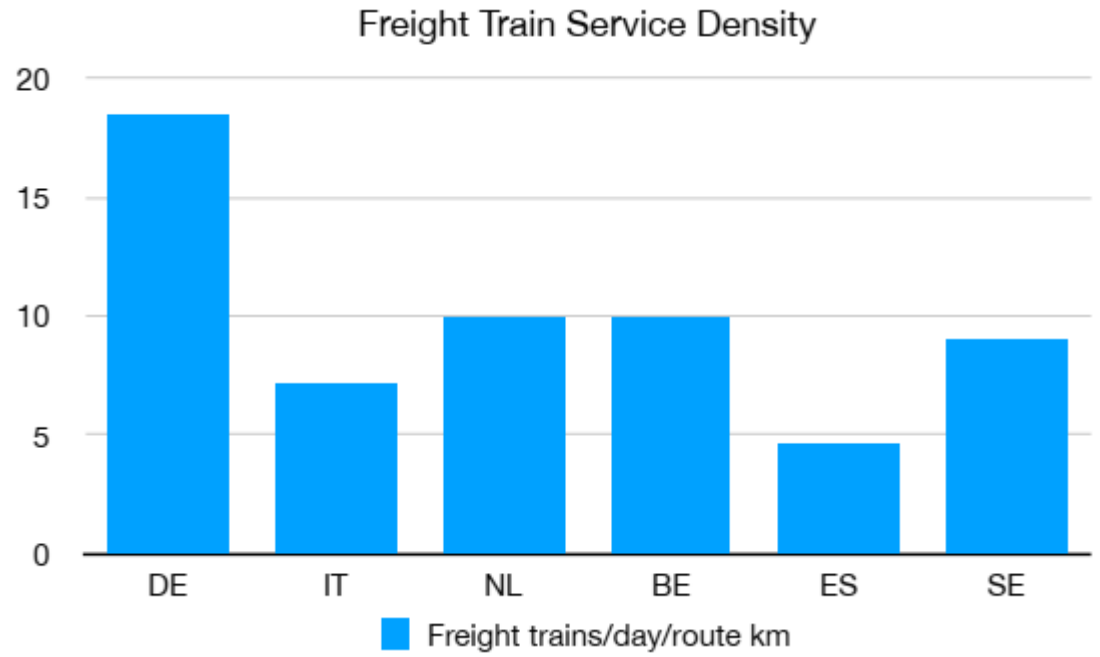
Sweden's relatively high freight intensity may be due to its better knowledge about the wide possible range of variability in the direct cost per gross tonne km for the calculation of the Mark Up, from 0.42 to 4.16, recognising the extra wear caused by high axle loads and train mass. It is clear that this differentiation, which enables Sweden to have the second lowest TAC in Table 2-5 for any kind of freight and charge only for the true extra cost incurred, has allowed it to attract more rail freight overall.

Figure 2-25 – Freight intensity of major European railways in tonne-km



The frequency of freight train traffic in Sweden is also very high for a country with such low population density, as we see from the figure, but less high than the high population density countries Belgium, the Netherlands and Germany. The higher rating in tonne-km/route-km suggests that its trains are considerably more heavily loaded than Italy, the Netherlands and Belgium. This can also be led by the economic structure of the economy and the level of industry in the GDP of each Country.

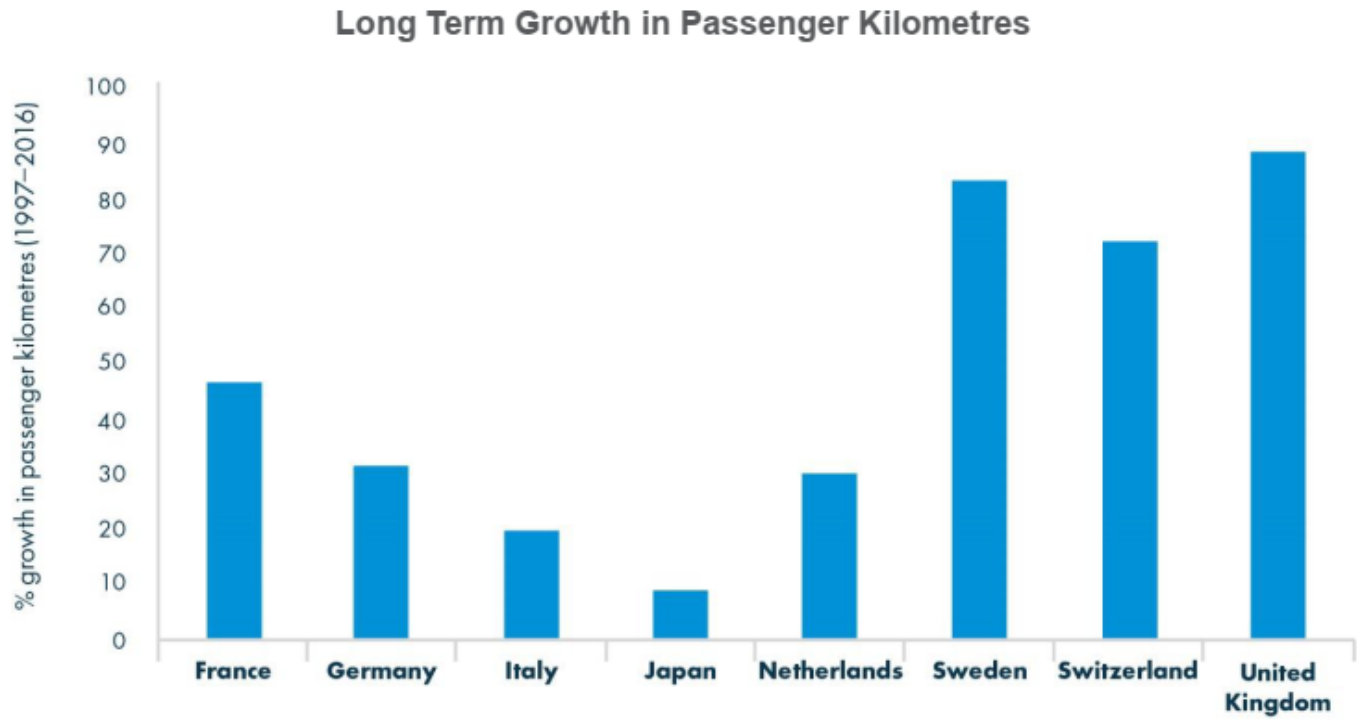
Figure 2-26 – Freight intensity in train frequency



If we compare Figure 2-26, Figure 2-27 and Figure 2-20, we note that high density populations tend to have high levels of rail-freight, even though they have relatively high TAC rates for freight, and Belgium, which has lower TAC ratesfor freight, has a lower freight density than the Netherlands. This suggests that TAC rates may not always play a crucial role. Sweden may be the most successful of the low density countries primarily because of its market orientation, open competition and better knowledge of relative relevant costs, than just because of its low TAC rates, though that is likely to be a key factor in attracting a proportion of freight that would otherwisebe uncompetitive by rail. Belgium has no good data about its own costs (and probably not about customers' competitive positions either) and therefore may have wasted the opportunity of its lower TAC rates.

In terms of passenger services, Sweden's record is outstanding for a country with such a low population density. First of all, since opening up the market to competition, Sweden has achieved the highest growthrate of all the countries in the EU other than the UK.

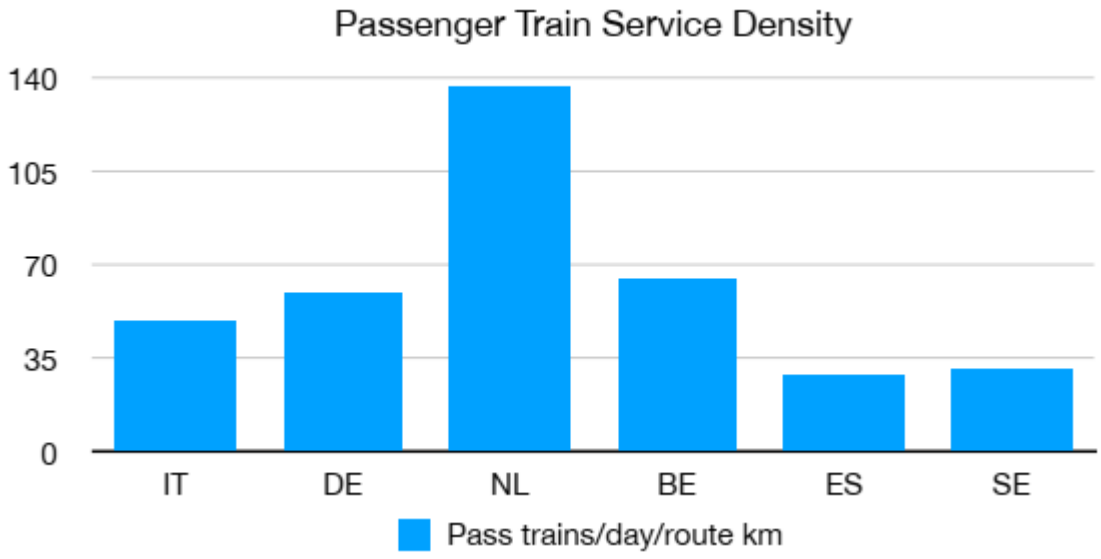
Figure 2-27 – Growth in passenger kilometres between 1997 and 2016



Specifically, the growth rate in passenger kilometres in Sweden over the period 1997-2016 was the second highest in the EU at 84%, only exceeded by the UK (at 89%), which had a similar TAC, IM grant and competition model. (Source: OECD Data quoted in The Williams Review 2019: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/786969/current-railway-models-gb-and-overseas-evidence-paper.pdf).

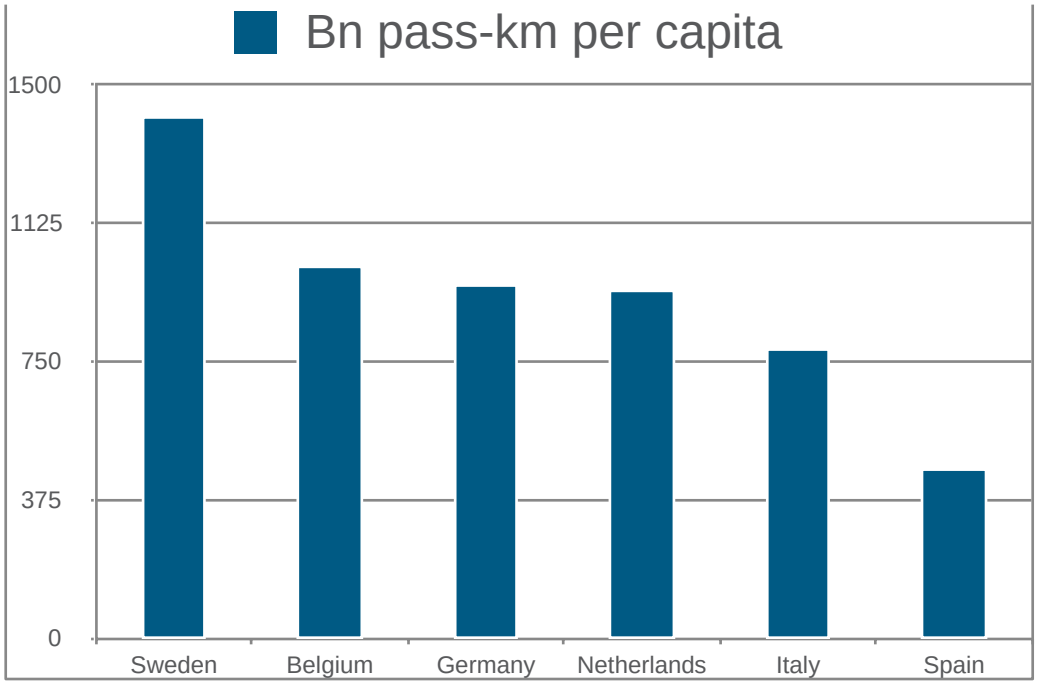
Sweden has a highly transparent process and this, together with the low TAC levels, means that long distance services are run as open access or under contract. Regional and suburban services are run under contract from regions. As table 6-1 and Figure 8-8 below show us, the frequency of Sweden's passenger trains is higher than Spain, but lower than the other, more densely populated countries. However, it is muchhigher than one would expect from a low population density country.

Figure 2-28 – Passenger train service frequency



One effect is that in terms of passenger-km per head of population, when we take into account the low density of the Swedish population, Sweden's passenger intensity is the fourth highest in Europe and compared with the other countries selected for benchmarking in table 6-1, it is by far the highest, as demonstrated below in Figure 8-9. This is a strong argument that low Track Access Charges can lead to amodal shift to passenger railways.

Figure 2-29 – Passenger-km per head of population



Another advantage of low TAC rates is that uniformity is higher.

The prioritisation for the capacity allocation in Sweden is created by the IM and it takes in account the priority for every single train. There is a calculation of the socio-economic impact of every train and the relative priority of the train is given in function of this element.

This system is possible to create in all countries and is not dependant on the level of Network Grants given to the IM.

Transparency is also independent of the level of the Network Grants because it depends both on a common language, the variables used by every single country in the TAC calculation, and also on a sophisticated understanding and analysis of cost effects, leading to Sweden's axle load and train mass load premiums.

2.11.2.2. Italy

Italy shares two characteristics with Sweden:

- It has a low TAC rate for passenger services other than those on High-Speed trains. It shares this characteristic also with Spain.
- There is a high level of competition, in particular in the High-Speed rail (open access) and freight rail(where new entrants have more than 50% of the market share).

There is a low level of TAC in Italy for the High-Speed rail, if compared with other countries in the analysis.

Where Italy differs completely from Sweden is in its prioritisation of capacity allocation, in which the priorities are set by policy makers for political strategical, not socio-economic reasons. In particular, in peak hours, the priority on mixed traffic lines is set as 1. High Speed trains; 2. Commuter and regional rail; 3. Rail freight.

With the benefit of a very low TAC level, there are incentives for freight traffic to shift to rail, but as we saw with the Belgium-Netherlands and German comparison, TAC rates are less decisive in determining freight density than other factors, such as international supply and demand and the network's geographical location.

2.11.2.3. Spain

Spain's IM for High Speed rail is ADIF, which receives a low level of Network Grants. The TAC regime aims at the maximisation of the revenues of ADIF, so the level of TAC is very high for the High-Speed rail segment. This has the effect of discouraging High Speed operators, so the traffic in the High-Speed rail is low in Spain compared with other countries.

Without enough TAC revenue, ADIF is not profitable. ADIF is wholly owned by the central government. Under this status, ADIF cannot become bankrupt or insolvent so that if it is not provided with further financing support by the Government, the liabilities of ADIF, if facing distress, would be transferred to the state

In the case of rail freight, the low level of traffic is related to a policy in favour of road transport, rather than to the level of TAC, which is very low.

This element has a negative impact on the optimisation of the system for environmental impact, which in Spain is very low and dysfunctional. Spanish Government is working on a new railway law to review Track Access Charges for High-Speed rail and to incentivise the use of rail freight,

In Spain, when High-Speed competition started in 2021, the process of capacity allocation given to different operators (included the incumbent RENFE) was unclear, lacking in transparency,

Capacity allocation was not a process of open access, but a tender for the capacity allocation for the High-Speed operators. The entrance in the market was unattractive for most private players due to the lack of transparency and the high level of the TAC for High-Speed trains.

In Spain, component A (Direct Cost) for High-Speed Rail is very high and the Regulatory Body is analysing the elements that could lead to this result. A railway reform is currently under scrutiny by the Spanish Parliament with the objective of a clearer calculation of the TAC.

2.11.2.4. Belgium

Belgium's TAC is high for passenger services.

Belgium does not differentiate between the level of the IM's direct cost for freight traffic compared with passenger traffic. There is a low level of transparency and no relations to the typology of the train.

The objective of the TAC level is to maximise the revenues of the IM, Infrabel, however the Mark Up for rail freight is zero in Belgium, which is at odds with the intended maximisation of revenue.

There is no real competition, either in long distance services or in High-Speed services in Belgium. The high level of TAC could be considered as an entry barrier.

New entrants have lower passenger volumes, driven by lower service frequencies compared with the incumbent. A higher TAC allows the incumbent to be stronger than new players, because the incumbent'sability to pay is higher.

2.11.2.5. Netherlands

TAC rates are among the highest for all classes of transport. This is offset, as the paragraphs below clarify, by high transparency. As a result, small regional private contracted passenger service companies exist albeit very limited, but there is open competition for freight services, for which in July 2019, the European Commission approved under EU State aid rules a €70 million support scheme to encourage the shift of freight traffic from road to rail. The scheme, which will run from 2019 to 2023, will be open to all railway companies operating in the Netherlands that have an access agreement with the Dutch rail infrastructuremanager, ProRail. The support will take the form of compensation payments to railway companies to contribute to the cost of track access charges.

The sector-specific regulator is the ACM, whose powers are not only based on acts containing provisions for enforcing competition law, but also acts and regulations that apply to the rail industry. In 2016, it concluded that NS had abused its dominant position during the tender process in 2014 for the public transport contract in Limburg (a southern province) and put its competitor at a disadvantage in this regional tender process.

The ACM imposed a fine of €40.95 million on NS. However, on 27 June 2019, the District Court of Rotterdam annulled this decision and so the fine. This decision shows that the burden of proof for the ACM in establishing an abuse of dominance infringement is remarkably high. (Source: https://www.lexology.com/library/detail.aspx?g=656d23d7-a078-465a-8f5d-a083f1c22bc5).

On Sept. 16, 2021, the Dutch National Competition Authority (ACM) approved the application of Arriva—a Dutch railway company— for three new train services that the transport company wants to start operating in

2023. Based on European legislation, such services may be offered as a so-called open access service as of 2021, provided the services do not have a significant negative impact on an existing concession.

After investigation, the ACM concluded that Arriva's proposed expansion would not have such an impact: the maximum negative impact on the profit margin of the main rail network concession, operated by National Railways, would be 0.03%. This marked the first time the ACM carried out such a test. (Source https://www.lexology.com/library/) This suggests that although the level of transparency is high, the level of uniformity is still not, with incumbent operators favoured and openness to competition existent but limited.

2.11.2.6. Germany

Germany represents an intermediate scenario: the TAC level is at an intermediate point for conventional passenger rail and freight rail, apparently aiming at a break even point. As a result, there is competition in the PSO contract and to a very limited extent on long distance passenger services.

In the case of High-Speed rail and international services, there is a high level of TAC, making competitionmore difficult or impossible.

The traffic level is very high thanks to the density of the country, but also to a moderate TAC level, because Direct Cost is relatively low, due to a high level of Network Grants to the IM.

The transparency of the system is given by the elements considered for the calculation of the Direct Costand the Mark Up.

Prioritisation does not depend on the value of the traffic. Freight and passenger rail services are at the same level if they are considered integrated services.

Thanks to intermediate level of the Mark Up component, a good modal shift to rail freight has allowedGermany to have a good environmental impact.

2.12. Analysis of Best Practice

2.12.1. TAC

2.12.1.1. Direct Cost:

The Direct Cost component of TAC for the RB railway line will have to be calculated by considering the forecast traffic as there is no historical cost data on which the Infrastructure Manager can rely. There is a risk that if there is not a common view of traffic forecasts that the Direct Cost of RB in each of the Baltic nations could be different in every country if there is a separate IM for each country or no means of coordinating TAC.

Typically to calculate TAC, you need the previous historical data to be able to develop the financials and traffic forecasts, and this is the assumption (but not the requirement) of the EU legislation. For the Rail Baltica railway, however, the IM will have access to detailed asset information and will be able to use this from inspection, maintenance, renewal and operational periodicities to estimate the cost of operating the railway. The future manager will also be able transfer some risk through build and maintain contracts. It might even be argued that from the design process the future manager may have better quality data available than is the case in most railways, particularly in terms of asset condition and the design life of component elements. In addition, the future manager Baltica will be able to draw upon industry model to forecast track deterioration, vehicle characteristics & performance.

However, (1) that does not remove the risk of traffic levels being significantly different to forecast and (2) such a sophisticated approach might still give different results (from the selection of different models) if used by three different (national) IMs along the route. Because understanding the Direct Cost of rail services (especially freight) is so vital to TAC pricing because it provides the floor to pricing – it is vital that a common approach is adopted for the whole route.

Table 2-12 - Constituent Elements of TAC Best Practice

Constituent Elements of TAC	Are these Best Practice
Direct Costs, (including Direct Costs for dangerous goods and military traffic) The key factors speed and weight were identified as “best practise” in the section in this report on Direct Costs	Yes, as required legally.
Fixed Access Charge	No, as does not reflect market or costs.
Supplemental Charge (for investment)	No, as this can be confused with regular upgrades and investment.
Reservation or Cancellation Charge	Yes, as it underpins the use it or lose it recommendation of the EU Legislation.
Volume Charge	No, limited use by IMs now being withdrawn by last nation (Spain), as prejudicial against Railway Undertakings.
Congestion and Capacity Charge	Yes, as it encourages efficient use of the network.
Environmental Charge,	Yes, but the nature and scale of this is a political decision.
Mark Up	Yes, where there is a genuine ability to pay, but this may be limited and too high a Mark Up risks a loss in traffic, particularly for freight, but much less for passenger services where part of a concession of government.

Table 2-13 - Associated Elements of TAC Best Practice

Associated elements of TAC	Are these Best Practice
Electrification charge	Yes, as it acts like a Direct Cost.
Charges related to the use of facilities	Yes, because of EU Legislation requirements.
Land rental charges	Yes, because requires efficient use of land.
Station Facility charges	Yes, because it requires efficient use of station facility.
Station Call Charge	No, because adds a degree of complication to Direct Costs, there are very few Direct Cost elements.

2.12.2. Mark Up

Issue: Mark Up component of TAC for a given market segment should not be higher than that market segment can afford. This would be a specific issue for freight and open access services as it will not be clear what the market will be able to afford given RB is a new infrastructure. It is also likely that the high Mark Up achieved for freight on the 1520 networks in the Baltic states is unlikely to be achievable on the standard gauge railway because of the different (freight) traffic opportunities and the fact that the existing traffic has managed to date without rail.

Volumes, especially freight, will take some time to develop, as market opportunities become clearer, and logistic terminal infrastructure is developed. It may take several years before it is clear if and to what extent the market potential as defined by freight demand forecast will be realised.

As a result, it is unlikely that the future manager (or even rail freight undertakings themselves) will be able to understand the capacity to pay of freight railway undertakings – and therefore there is a risk that high Mark Ups will discourage the demand. On the other hand, low Marks Ups imply risks of revenue losses for the future manager and, potentially, the need for Network Grant to the IM, although beneficial to modal competitiveness of rail freight, encouraging more freight and logistic companies to use rail freight services. A lower level of Mark Up, following the SRMC criteria, as implemented in Sweden, allowed to have a higher use of the network.

2.12.2.1. Guarantee and Network Grant

Issue: to have guarantee of the recovery of its costs, RB Infrastructure Manager (“RB IM”) will need an underwriting (or a Network Grant guarantee mechanism).

As previously discussed, there is a probability that the RB IM will be not able to secure enough revenue from TAC to pay its costs without requiring TAC Mark Up levels so high that they may deter open access freight and passenger railway undertakings from using RB. That probability – even if it is only a possibility - will mean that RB IM will need a financial guarantee to be able to operate in an open market, unless an operator from the private sector is willing to take that commercial risk in return for regulated income. That degree of private sector risk taking, however, is unlikely in the early years of RB operation, when the market will be uncertain. In addition, in the first years of operation any IM on the RB route will have to rely on traffic forecasts rather than historic traffic patterns.

It is likely therefore that the national governments will have to guarantee any IM’s financial standing.

Nevertheless, whilst trains will impose wear and tear costs on the network from day 1 and there will be a cost in operating and inspecting the rail infrastructure network, there will be a significant lag in time before there is any need to undertake maintenance and renewal which should benefit the future manager in the short-term.

However, the high level of fixed costs for the railway network means that any lost traffic could result in a financial shortfall for the IM. Without any explicit underwriting of RB IM’s costs by RB IM shareholders, this shortfall will probably only be manageable through increased TAC, which will in turn deter more open access operations, potentially leading to a downward spiral.

The efficiency of the IM is another key element to take in consideration and it is important to have incentives to the control of the Total admissible Cost of IM/IMs.

2.12.2.2. Direct Network Grant:

The report shows how RB IM may well need to be subsidised directly (see section 2.5.5).

There may be significant resistance to any Network Grant for RB IM. This resistance will be motivated not only by the costs to be bored by the public finances, but also because the international nature of RB means that this approach could create an additional risk of cross-Network Grant between the shareholder nations; as the pattern of services utilisation of RB will not be geographically even and the shareholder nations that result having lower demand could argue that they should subsidise the RB IM less. A direct IM Network Grant policy is therefore not recommended. Similarly, as direct underwriting RB IM's income could lead to a direct Network Grant scheme, also this is approach is not recommended.

The Network Grant will depend on the structure of the IM for the three Baltic States, for example is it one for each state, or one for the whole infrastructure.

Grants to the Railway Undertaking could be co-ordinated between different states. At the moment Grants are made to each individual state; there is currently no Member State wide example (of the scale of the Baltic States), in Europe where a Grant is shared for a body that has authority over multiple states.

This will be further analysed and discussed in WP1.3, which is part of the second deliverable of this study.

2.12.3. Capacity Allocation:

Best practice requires that a clear framework be established.

Best practice also suggest that capacity should be allocated to the traffic first that is most certain to operate, or else it causes planning difficulties.

RB stakeholder countries have to agree about the prioritisation rules of the traffic. HSR passenger services are vital to the RB business case, to secure EU funding and to obtain political support and it is therefore important to give to these services given priority in the capacity allocation procedures to come, while regional services could increase connectivity in the region. The role of freight transport is key especially for intermodality.

In the benchmarking analysis, the best practise is Sweden where priorities are given in function of the socio-economic benefits of a service.

One way of securing the prioritisation of the RB HSR passenger services in the capacity allocation procedures is to have the RB IM taking part in the implementation of the potential concession contract for HSR services.

TAC for HSR services:

- The Mark Up for these services can be high in accordance with EU law.
- It is recommended that if services are contracted as part of a concession agreement, they secure capacity prioritisation (after international express).
- If the pricing for open access is low, it will encourage greater uptake.

2.12.4. Congestion Capacity Charge

EU Legislation allows for congestion charging. If applied in a way that charged extra for peak time periods it would spread out use of the railway which would improve operational reliability/punctuality and free capacity for users willing to pay, thereby increase net revenue.

This means that by which any Network Grant to RB IM could be reduced if open access proves attractive – in part because of the potentially low TAC. If applied in a way that charged extra for peak time periods it would spread out use of the railway which would improve operational reliability/punctuality and free capacity for users willing to pay, thereby increase net revenue.

2.12.5. Freight train specification

Best practice suggests that the charging regime for freight should be based on the optimum operating characteristics. RB line has been designed to accommodate the operation of freight trains that have a defined specification. For example, they should be able to operate at 120 km/h and be no longer than 1050 meters, if they are able to travel through Germany and Poland with these infrastructure characteristics.

If the TAC for freight services is charged per train, it will discourage operators from running shorter trains and using available capacity. The gross tonne-km could be used as it is done in Sweden for the calculation of the direct cost.

The TAC for freight services can also be modulated around the freight services optimum speed for the RB infrastructure; freight trains that need to be timetabled at a speed lower than this ideal (e.g., because of their weight or tractive power) could be charged a premium equal to extra trains paths that they might occupy.

RB IM could create sub-segment of the market to consider added value based charging with the related ability to pay (Mark Up). For example, lower charge for intermodal, and container block trains, etc.

2.13. Summary and Next Steps

In the benchmark analysis the EU legislation permits to have completely different scenarios for the Direct Cost, Mark Up and Capacity allocation.

Countries, within the “large” limits given by the regulation is able to have different level of Direct Cost (and different elements could be considered), of Mark Up, of Network Grants (that have impact on the level of the Mark Up) and completely different scenario for capacity allocation.

It is important to underline that Direct Cost has to be recovered by the Infrastructure Manager. It is possible to introduce several variables to “fine and tune” the component A of the track Access Charge, linked to the direct cost of the infrastructure.

Some variables, as the gross tonnes km, are important for differentiate the “value” of the transport of goods, also in the Mark Up.

The use of the train km could lead to a type of transport of very heavy trains and less intermodal/containerised trains.

In the case of RB it is important to understand the exact typology of traffic for freight trains. The traditional specialisation in bulk rail freight along the East-West corridor (mainly, Russian oil and coal) will decline while it is important to be able to have a good regulation to attract intermodal traffic in axe north-south.

The use of some the same Direct Costs for all type of services (example from Belgium) is not good example because this system is not able to make a differentiation for typology of traffic.

In general, it is worthwhile – if possible:

- To understand the ability to pay of every single segment or sub-segments that will be created in the legislation.
- To understand if it is possible to have a low Mark Up level, as in Sweden, with a very efficient infrastructure Manager or Managers and high level of Network Grants.
- To clarify what is the acceptable level of Network Grants for rail services in Baltic Countries.
- To create a system able to understand the level of socio-economic impact of every single train to assign a priority in the capacity allocation.

The missing element is a good forecast of the demand not only to solve all level of the demand to calculate the ability to pay of every single segment or sub-segments, but also to create a system of prioritisation of the capacity allocation.

Given the level of the Network Grants acceptable by the Governments, the ability to pay and the forecast of the demand, it is possible to understand if it will be possible to have open access both for freight and High-Speed services.

The commuter services will be run under the PSO regulation, but they will have an impact of the economic equilibrium of some of the High-Speed services, if there will be some “similar” services.

Another problem to be solved is related to different entry in services of different part of the network.

Rail freight services are able to be more efficient if there will be the possibility to operate long routes and the fact that this possibility will be not implemented at beginning of the entry in service of a part of the network, the ability to pay and the demand will be lower for this segment.

It is important to have a study of development of the demand every 3/6 months, after the entrance in service of the operations, to give the Regulatory Body/Bodies and IM / IMs the opportunity to calculate the evolution of the ability to pay.

There is another key element to consider: in many cases in Europe, there is a fragmentation of infrastructure managers between countries and the regulation of track Access Charge and capacity allocation vary between countries.

There is a limited space of coordination between countries, in particular for the capacity allocation of some international route and right now there is no coordination about Track Access Charge also for international services.

In general, coordination is very limited between Countries, and this is one of the limits of the rail sector that it suffers from fragmentation of rules at Member State level.

3. Work Package 2 – Service Contracting Models

3.1. Work Package 2.1 Overview of EU Legislation for Service Contracting Models

The EU has been issuing legislation in the rail sector for over 30 years. These have all been aimed primarily at liberalising the railway network in Europe, with the aim of removing the existing national monopolies within each country and thus increasing competition. The EU's aim of increasing competition for services is to reduce the costs of the rail industry, thus improving efficiency and to provide customers (passengers or freight concerns) with a better service, thus promoting greater mode shift to rail. In opening up the markets the intention has also been to provide better, safer, interoperable railways across Europe.

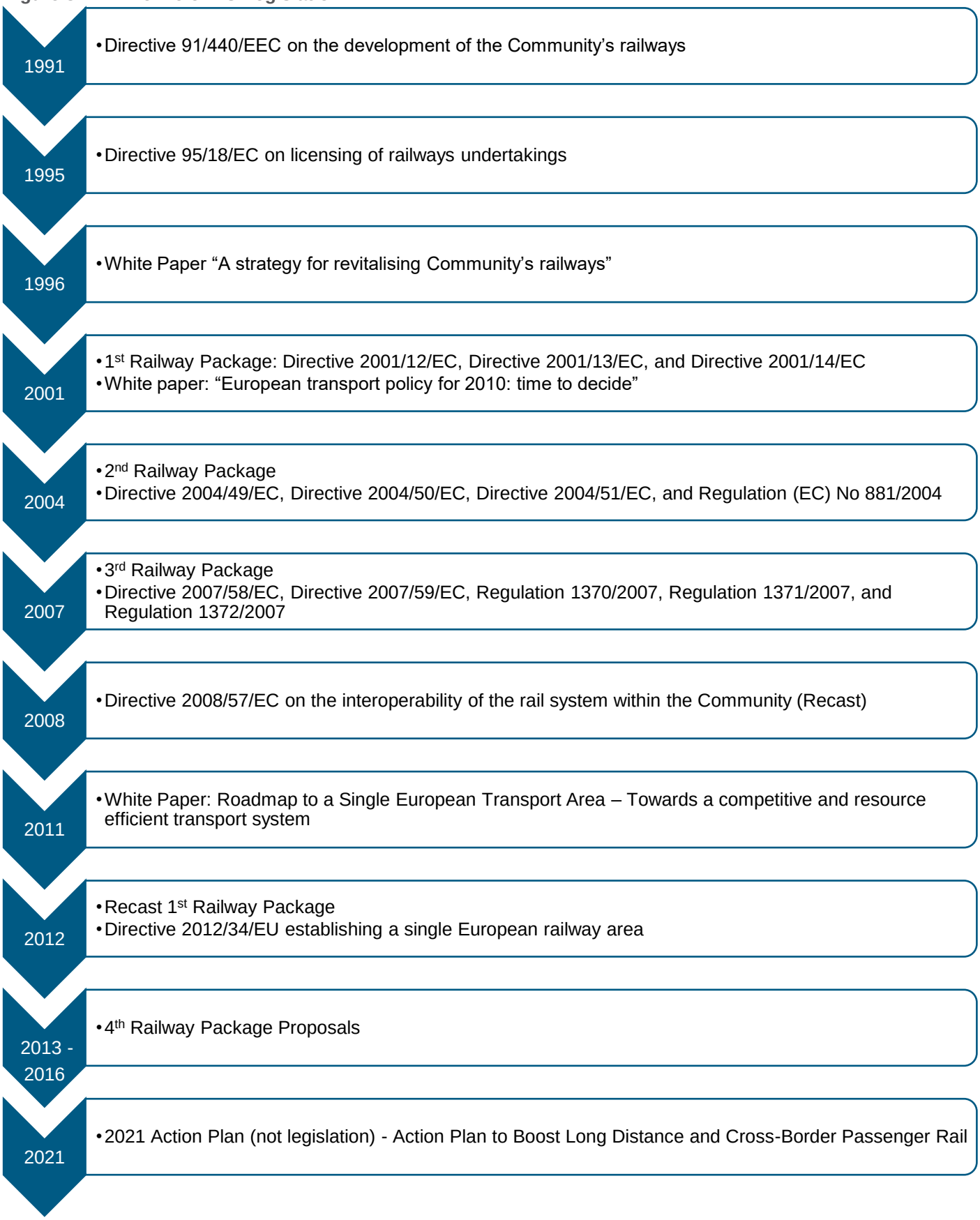
From the liberalisation in the 1990's (and, partly, privatisation of former state incumbents) and gradually opening up for competition through the fourth railway package providing full access for rail undertakings, there has been a more recent focus on domestic markets and a move towards a fully integrated European Railway Area. This new focus explains why interoperability plays a much bigger role today (as reflected, for example, in the CEF priorities).

This section of Work Package 2 is concerned with providing an overview of the EU legislation and then setting out the implications for both passenger and freight services of this legislation. The implications of the legislation for the choices that face the owners of the RB infrastructure will be discussed in the subsequent section.

3.1.1. Overview of EU Legislation with regard to the Railways

A timeline of the EU legislation is set out in Figure 3-1 below, with the further sections providing more detail on the various Directives and Railway Packages.

Figure 3-1 - Timeline of EU Legislation



3.1.1.1. Early Directives

The first directive (91/440/EEC) was issued in 1991. This made it a legal requirement for independent companies to be able to apply for track access on a European Union country's network, thus allowing them to run services. These are known as 'open access' operations. This right to track access was to be applied on a non-discriminatory basis, thus preventing the favouring of the incumbent national operator that dominated in each of the EU markets up to this point.

In 1995 with further directive (95/18/EC) was issued on the licensing of 'railway undertakings' (the train operators). This set out a framework and guidelines for the way in which countries in the EU provide a licence to organisations operate train services.

3.1.1.2. First Railway Package

The First Railway Package was the collective name given to a series of legislation issued in 2001. It comprised three Directives:

- Directive 2001/12/EC. Allowed cross-border freight operations in the EU;
- Directive 2001/13/EC. Provided further clarification around the earlier Directive 95/18 on the licencing of railway undertakings; and,
- Directive 2001/14/EC. Set out the framework for the establishment of organisations to control and regulate line possessions for companies, and the charge to use the track.

The main concerns of this package were to allow international freight operations in Europe, and to establish the principle of charging for track access.

3.1.1.3. Second Railway Package

The measures that became known as the Second Railway Package followed in 2004. It comprised three Directives and a Regulation. These were as follows:

- Directive 2004/49/EC. Concerned with railway safety. It harmonised safety principles across Europe, including setting out procedures for granting safety approvals;
- Directive 2004/50/EC. Harmonised interoperability requirements, particularly around high speed operations;
- Directive 2004/51/EC. Allowed open access operations for freight services, both domestically and internationally;
- Regulation (881/2004), accompanying the directives, established the European Railway Agency to coordinate safety and interoperability efforts.

This package of measures was primarily concerned with harmonising safety and interoperability. It also extended open access freight operations to domestic markets in the EU.

3.1.1.4. Third Railway Package

The measures that became known as the Third Railway Package followed in 2007. It comprised the following legislation:

- Directive 2007/58/EC. Directive on open access passenger operations;
- Directive 2007/59/EC. Directive on harmonised licences for train drivers;
- Regulation 1370/2007. Regulation on PSO contracting procedures; and
- Regulation 1371/2007. Regulation on rail passengers' rights and obligations.

A key piece of legislation in the Third Railway Package proposals was to allow open access operations for international passenger traffic. The Third Railway Package proposals did, however, also include Regulation 1370/2007, which set out the rules for the issuing of Public Service Contracts (PSC) to meet Public Service Obligations. This Regulation included guidance on when, and how, PSCs can be competitively tendered and when, and in what circumstances, they can be directly awarded. Regulation 1370/2007 was augmented in the Fourth Railway Package proposals and is still a key piece of legislation in underpinning how PSCs are awarded today. This is examined in more detail later in this section.

3.1.1.5. Fourth Railway Package

In 2011 a European White Paper, 'Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system', was published which unveiled the vision of a Single European Railway Area (SERA). This was followed by legislation in 2012, Directive 2012/34/EU which established the Single

European Railway Area. This legislation effectively recast the early EU legislation (from 1991 and 1995) and that contained in First Railway Package and merged them into a single new act.

The Fourth Railway Package then followed and was launched in a document with the title, 'The Fourth Railway Package – Completing the Single European Railway Area to foster European Competitiveness and Growth', dated 30/1/2013. The Fourth Railway Package is made up of six legislative proposals which came into force from 2016. These focussed on four key areas:

- EU wide approvals: To save time and reduce costs, rolling stock should be built and certified once to run everywhere in Europe (so-called 'One-Stop-Shop (OSS) authorisation process). There should be one safety certificate for companies so they can operate EU wide;
- A structure that works. To ensure the rail network is run in an efficient and non-discriminatory manner, the Commission proposed to strengthen the requirements upon infrastructure managers and ensuring that the two functions of managing the tracks and running the trains is separated;
- More access to the railway (the so-called, 'Market Pillar'). To encourage innovation and efficiency, the Commission proposed to open up domestic passenger railways to new entrants and services efficiency; and,
- A skilled workforce: A vibrant rail sector depends on a skilled and motivated workforce. The rail package ensures that Member States can go further to protect staff when public service contracts are transferred.

The purpose of the Fourth Railway Package was to tackle the barriers to entry and inefficient administrative procedures that remained in the European railway market. It effectively aimed to complete the legislation introduced in the earlier Railway Packages by opening up domestic passenger services for competition, and tightening up on safety, technical and interoperability standards.

The prime legislation underpinning the Market Pillar strategy, which effectively deals with passenger services, are:

- The Governance Directive (EU) 2016/2370 (which is an amendment to Directive 2012/34/EU); and
- The Public Service Obligation (PSO) Regulation (EU) 2016/2338 (which is an amendment to Regulation (EU) 1370/2007).

The original intention in the Fourth Railway Package legislation, was that by 2019 Railway Undertakings must be granted access to provide all services, including domestic passenger services, in all EU Member States. During its passage through the European Parliament, however, the requirement to introduce competitive tendering for all Public Service Contracts was put back to 2023.

3.1.1.6. Action Plan to Boost Long Distance and Cross-Border Passenger Rail

No further legislation has been issued since those highlighted above but the EU has recently published a paper, 'Action Plan to Boost Long Distance and Cross-Border Passenger Rail' (14th December 2021). Whilst it isn't legislation this paper makes a very clear case for the growth of rail within Europe, with, as the title suggests, an emphasis on Long Distance and Cross-Border passenger services. This growth is considered to be essential to enable the Commission to meet the Climate Change agenda and Net Zero commitments. The paper highlights a number of actions to remove obstacles and further develop long distance and cross-border passenger services:

- Better implementation of the Union rail acquis and accelerated inter-operability. This action is effectively around ensuring that existing legislation is implemented and implemented correctly. It is also about accelerating ERTMS deployment across the continent.
- A strengthened infrastructure for passenger rail. This action is effectively around revising and strengthening the European TEN-T rail network, with a particular emphasis on consistency across borders.
- Sufficient rolling stock availability. This action is consisted with making it easier for rolling stock to be made available. Specific actions include seeking specific projects for the European Investment Bank to acquire rolling stock, preparing 'go everywhere' passenger rolling stock specifications and clarifying State Aid rules around purchasing rolling stock.
- Bringing train drivers and railway staff training and certification in line with future needs. This action includes revising the regulatory framework around rail driver training to address current issues and to make it simpler for drivers to be accredited. It also includes proposals to promote policies and programmes to up-skill and re-skill staff.

- A more efficient use of the networks. This action includes measures to assess the need and propose, if necessary, regulatory action in 2022 to improve capacity allocation and traffic management processes. It also includes a consideration of a specific Union-level entity to oversee the optimisation of cross-border rail traffic and coordination mechanisms for its better integration into the national traffic.
- Appropriate pricing for track access. This includes a specific action to provide guidelines in 2023 for setting track access charges which support and encourage the development of long-distance and cross-border passenger services. It also includes a commitment to actively pursue pilot projects to explore whether a reduction of track access charges to direct cost levels could better support the establishment of cross-border operations. It also makes a commitment to examine State Aid rules around the reduction of track access charges.
- User friendly ticketing and access to the rail system. The key action in this is a commitment to propose a Regulation, by the end of 2022, on multi-modal digital mobility services. The purpose of this will be to enhance data exchange between mobility providers and facilitate fair commercial agreements between Railway Undertakings and third-party ticket sellers.
- A level playing field with other transport modes. This action is concerned with alignment with the EU's 'Fit for 55' package, which is a set of proposals to align economic incentives with climate, social and environmental objectives, including changes to the emissions trading and the energy taxation framework. It also states that it will examine the need for an EU-wide VAT exemption for international train services.
- Public Service Obligations to promote sustainable cross-border and/or multi-modal collective transport. The key action under this heading is that the EU has undertaken to publish, in 2022, interpretative guidelines for applying the Land PSO obligation, including to long-distance and cross-border rail passenger services. This should effectively allow competent authorities to cooperate and establish cross-border PSOs, removing current practical and administrative barriers to doing so.
- Empowering Youth. This action is concerned with promoting sustainable modes of transport for young people. It also includes a specific action to look at amending the Erasmus exchange re-imbursement rules to promote rail travel.

It is apparent that many of the actions highlighted in the recent paper cover the main areas where there has already been legislation introduced, so is consistent with legislation. It does imply, however, that the Commission is keen to further encourage competition for rail passenger transport for long distance and cross-border links, which are two of the key markets for the RB scheme.

3.1.2. Implications of EU Legislation for Passenger Services

From the overview of legislation outlined above it can be seen that whilst the initial foundations for operating passenger services was established in the early directives, it was not until the Third Railway Package that competition for passenger services was formally introduced. The Market Pillar within the Fourth Railway Package then addressed the end-state for passenger services throughout Europe, including updating the legislation on open-access and operating PSOs from the Third Railway Package.

Within the Market Pillar of the Fourth Railway Package, the aim is to open up domestic passenger railways to new entrants and services and to make competitive tendering mandatory for rail Public Service Contracts (PSC) in the EU. It requires national governments to introduce legislation allowing the tendering out of contracts for running passenger rail services. The Market/Political Pillar's key objectives are:

- The opening of long-distance commercial passenger markets in Europe;
- The use of public tendering as general rule for public service contracts;
- A more effective and controlled train path allocation and infrastructure charging, and
- Promotion of a common platform for information and ticketing.

3.1.2.1. The Governance Directive (EU) 2016/2370

The first of the two Directives and Regulations underpinning the Fourth Railway Package, the Governance Directive 2016/2370, updates the earlier Directive 2012/34/EU. This Directive establishes that rail operators located in one Member State have the right to operate all types of rail services, including purely domestic ones, in any other Member State. This is done by extending provisions that previously applied only to international railway passenger services, This effectively provides a requirement for the opening up of domestic services to competition.

Governance Directive (EU) 2016/2370 therefore aims to establish the principle of 'open-access' operation within European rail markets, by granting Railway Undertakings this right of access to railway infrastructure in all Member States. It does recognise, however, that granting this right of access might have implications for the organisation and financing of rail passenger services provided under a public service contract, so it upheld the use of the existing public service contracts where they benefit the economic equilibrium within the market. Thus, a competent authority still has the ability to grant exclusive rights in accordance with the PSO Regulation (EU) 2016/2338 (see section below).

Furthermore, this directive aims to safeguard the requirement for an independent Infrastructure Manager (IM), including transparency requirements, increased regulatory oversight, and mandatory participation in the European network of infrastructure managers (Platform of Rail Infrastructure Managers in Europe, PRIME).

The Directive strengthens the IM position with the aim of ensuring its independence as well as introducing an explicit prohibition of access discrimination. Although Member States are free to choose the IM's organizational model, including vertical integration, the IM must remain impartial with regards to their essential functions. These essential functions are defined as decision-making concerning train path allocation and infrastructure charging.

The role of Regulatory Bodies is also enlarged and strengthened. Their remit includes the regulation of most of the activities of the IM and undertaking compliance checks of independence and transparency requirements. Rail operators can appeal to the relevant Regulatory Body on new specific grounds, in addition to being unfairly treated, discriminated against or is in any other way aggrieved. These are traffic management, renewal planning and scheduled or unscheduled maintenance and compliance with the requirements on separation and conflicts of interest.

Within 2016/2370, there are also specific rules for the operation of high-speed passenger services. The Directive acknowledges that the development of a high-speed rail network has the potential to create better and faster connections between the economic and cultural centres in Europe, and thus play an important role in encouraging the shift of passengers to rail. The Directive, therefore, aims to encourage the competitiveness of high-speed passenger services and establishes that, for that reason, open access for high-speed passenger services should be limited only in specific circumstances and following an objective economic analysis by the Regulatory Body.

3.1.2.2. The Public Service Obligation (PSO) Regulation (EU) 2016/2338

Regulation (EU) 2016/2338 is the latest update of the Regulation (EC) 1370/2007 (from the Third Railway Package) on public passenger transport services by road and rail, which set a clear legal framework to define and finance passenger inland transport services. The PSO Regulation aims to ensure that the principle of competitive tendering is respected by limiting the cases of direct award, and thus supporting increased market liberalisation. This regulation ensures that new entrants to the rail market will have access to rolling stock and market information, and that independent regulatory bodies will monitor the cases of direct award, where necessary, for a range of performance-based exemptions.

The earlier regulation, Regulation (EC) 1370/2007, was aimed at improving service quality, increasing competition in the market of land transport services, including for regions and towns and ensuring transparency in the award and execution of public service contracts. It does so by defining how 'competent' authorities may act in the field of inland public passenger transport, providing an exhaustive definition of Public Service Obligation (PSO), establishing that PSOs have to be incorporated in a Public Service Contract (PSC) (although there was room for exceptions) and laying down clear rules for calculating compensation.

A PSC is a legal agreement signed between a competent authority and a transport operator that defines rights and obligations of both parties, quantity and quality of services delivered under the contract and compensation, as well as use and ownership of assets, monitoring and management of the agreement.

While the original Regulation (EC) 1370/2007 provided the legal framework for PSO contracting for passenger inland transport services by defining PSO exhaustively and conditions for PSCs, it still gave some room for direct award of service contracts as the possibility of extending the existing arrangements. Regulation (EU) 2016/2338 updates are aimed at ensuring that the principle of competitive tendering is applied. It does so by limiting the circumstances in which a Direct Award can be made and by granting the tools to new entrants to compete. It also ensures that independent bodies and regulatory bodies are able to monitor the award.

With respect to the tools for new entrants to compete, Regulation (EU) 2016/2338 aims at ensuring effective and transparent access to rolling stock and competent authorities will now have the power to take all appropriate measures to enforce non-discriminatory access to rolling stock for all operators.

The PSO Regulation still allows for several exceptions to the principle of competitive tendering of PSC. These include annual contract value of 7.5 million Euros for rail services (lower for other modes), emergency, exceptional circumstances, in-house services and the newly added performance-based exemptions in the case of specific characteristics of the network or the rail market and improvement of performance.

3.1.2.3. Summary

Once the legislation in the Fourth Railway Package comes into law in December 2023 the aim is that there are effectively two methods for ensuring competition for passenger rail services within the EU. These are:

- 'Open Access'. In this scenario a qualified Railway Undertaking is able to set up and run services in any country in the EU. In this situation this effectively means that there is direct 'competition on the tracks' for passengers. This scenario will only arise for commercial services, where the Railway Undertaking can make a profit, as there is no public subsidy involved. It is also worth noting that the legislation specifically mentions high speed rail services in this context; and
- Competitive tendering of Public Service Contracts (PSCs). In this scenario a public sector body sets up a competition for the selection of a suitable operator. This is often known as 'competition for the tracks'. This usually involves an operator running a concession or a franchise on behalf of the authority. This is generally applied where there is the requirement for a public subsidy to run the services.

It is clear, however, from the legislation that it is not as clear cut as the above, as it will still be possible for authorities to prevent open-access operations if it can be proved that this will have a detrimental effect on Public Service Contracts. It will also still be possible for authorities to make Direct Awards of PSCs rather than undertaking a competitive tendering process.

3.1.3. Implications of EU Legislation for Freight Services

Regulation of rail freight services is less developed than that for passenger services. The 1st Railway Package allowed 'open access' international freight traffic and the 2nd Railway Package extended it to domestic freight operations. In theory, the railway market has been open to competition for some time. However, in reality, given the international nature of nature of most of rail freight, important barriers remain especially in relation to cross-border rail services. Lack of harmonisation and poor coordination among Member States have identified as blockages to rail freight competition.

Freight transport services are excluded from the PSO Regulation (EU) 2016/2338 and no further guidance is provided for freight services. However, there is no regulation that precludes defining PSO for freight transport services.

Rail freight can benefit from other types of State Aid, as determined in the 2008 Commission Guidelines on State aid for railway undertakings ('the Railway Guidelines'). The most relevant and used category from freight services is aid for the 'coordination of transport'. The needs of transport coordination can take several forms (paragraph 98 of the Railway Guidelines):

- Aid for infrastructure use that allows Member States to compensate railway undertakings (RUs) with the aim of covering infrastructure charges use;
- Aid for reducing external costs, designed to encourage a modal shift to rail;
- Aid for promoting interoperability ('interoperability aid') and greater safety, the removal of technical barriers and the reduction of noise pollution in the rail transport sector; and
- Aid for research and development in response to the needs of transport coordination.

This category has been used extensively during the Covid pandemic to support freight (and passenger) operators to affected by the coronavirus outbreak. The rationale for this measure wat that it would contribute to maintaining the competitiveness of rail compared to other modes of transport, in line with the objectives of the European Green Deal.

3.2. Work Package 2.2 – Critical Review of Service Contracting Models for Passenger Services

In Work Package 2.1 the current EU legislation for passenger service contracting models was laid out in detail, along with the current direction of travel within the EU. In this section, the options for operating passenger services on the RB infrastructure are established, based on a critical review of the current legislation.

In order to assist this review, however, there are two other pieces of work that are important in assisting with the understanding of the options available:

- Firstly, it is worth examining how the current EU legislation has been interpreted in the rest of Europe, and how this has translated into service contracting models; and
- It is apparent that the two options for introducing competition encouraged by the EU are dependent upon the likely surplus generated/subsidy required. Whilst this can be dependent to some extent on the level of Track Access Fee charged, the underlying profitability of the train services will also be important, so an understanding of the likely demand and revenue position for the different service groups will be important.

Each of these items are examined in the section below, before the considerations for RB are set out.

3.2.1. Benchmarking of Service Contracting Models across Europe

In Work Package 1.2 a benchmarking exercise was undertaken of six countries across Europe to examine how capacity allocation and track access charging was undertaken in each country. The countries examined were: Italy, Spain, Belgium, Netherlands, Sweden and Germany. It was considered to be beneficial to extend this benchmarking to examine the service contracting models in each of these six countries. This will allow any linkages between service contracting models and access charging to be determined, which will be helpful in any consideration of potential service contracting models for implementation on the RB infrastructure. It also gives a good general indication of service contracting models currently being pursued across Europe.

It is acknowledged that in the overview of EU legislation for service contracting models it is clear that the situation has been evolving in Europe for the last 20 years, with the liberalisation of the markets, particularly with regards to passengers, occurring incrementally. In fact, the full liberalisation package, enshrined in the legislation accompanying the Fourth Railway Package, doesn't become fully implemented until December 2023. Equally, we are also aware that some nations have been less keen than others to open their market up to competition in order to protect their national railway. It may therefore be that a definitive picture with regard to the best service contracting model cannot be determined at this time from the benchmarking exercise, but it should still prove a useful starting point.

Service contracting models across the six countries are considered for passengers in the remainder of this section.

3.2.1.1. Experience with Passenger Service Contracting Models across the EU

A total of six countries have been examined, consistent with the benchmarking exercise in Work Package 1.2. For each country we examine the existing service contracting models, differentiating between different passenger service types. We note that RB Rail have specifically requested that the following categories be examined: High Speed Rail, Regional international/cross-border, Regional local, and Night Trains. These categories are specific to RB as it is designed as a multi-national railway, which doesn't necessarily apply to the countries being examined. We have therefore looked at long-distance commercial services (which may or may not be high-speed), regional/local services and night train services in each country, plus any international cross-border services that are active in each country.

Each country is dealt with separately in the remainder of this section.

3.2.1.1.1. Italy

Regional rail services in Italy are the responsibility of the relevant Italian Regions. Whilst there have been a few examples of tendering of PSCs for regional passenger services, these services have generally been given to Trenitalia, the state operator, under the terms of a Direct Award. These contracts tend to be relatively long, and often extendable, and include specific terms and conditions that are negotiated, such as the need to renew rolling stock. Each region negotiates with Trenitalia on the level of service required and the funds it requires to be paid to deliver it. The region leads the specification of passenger services and development of the timetable but has to work closely with the Infrastructure Manager to ensure that adequate capacity exists.

For long distance services a new 10-year PSC to operate subsidised long-distance services was directly awarded to Trenitalia in 2017.

There is competition in Italy, however, on the high-speed network. In 2012, Italo began to operate intercity services as a new large open access player. It took around four years for the company to obtain all operating and safety authorisations as well as access to the paths required to operate attractive journey times on the routes where it competes. However, now that services are established, Italo's rail market share on its chosen routes has risen from 9% in 2012 to 35% in 2017.

Night trains in Italy are provided by the state-owned Trenitalia as part of their PSC that covers all long-distance services. Trenitalia's night train services provide a comprehensive network across the Italian peninsula.

3.2.1.1.2. Spain

Until recently, the majority of rail passenger services in Spain, including all long-distance rail passenger services, were provided by the state-owned company RENFE Operadora (RENFE). Most of the rail services with a PSC are run by RENFE, with some others run by regional government-owned rail operators.

In 2018, RENFE entered into a PSC that covered all commuting services (*Cercanias*), mid-distance services (*Media distancia*), including high speed services, as well as metric gauge services run historically by RENFE. The PSC was revised in 2019 to include an additional number of services. The contract has an extended duration, up to 2027, with the possibility of a 5-year extension, in line with the EU regulation at the time.

The high-speed train market was liberalised in December 2020. In 2019, the Spanish Government opted for a novel open market model. New operators were to enter framework track access agreements with ADIF Alta Velocidad (ADIF AV), the infrastructure manager of the high-speed network. ADIF AV, in its 2019 network statement, defined 3 corridors and their capacity, and made available 70% of each corridor's capacity for framework agreements. The corridor capacity was optimised and significantly increased from that established in previous network statements. ADIF AV decided to limit the number of frameworks to 3 per corridor and that they would have a maximum number of track access rights of 60%, 30% and 10% of the total available slots for framework agreements. The framework agreement for 60% of the slots was understood by all parties as tailored for RENFE.

The lots were awarded to RENFE, Ilsa-Trenitalia and SNCF. RENFE requested 86% of the maximum track access rights on Package A (60% of available slots), Ilsa-Trenitalia 70% of the maximum track access rights on Package A (30% of available slots) and SNCF 100% of the maximum track access rights on Package C (10% of available slots. In total, therefore, the bidders requested rights for 82.6% of the slots available. SNCF started operation under its Ouigo brand on December 2021 and ILSA plan to start their operation under their *iryo* brand in November 2022.

Furthermore, in July 2020 the Spanish competition regulator (*Comisión Nacional de los Mercados y la Competencia*, CNMC) gave approval for private companies to compete with the incumbent on medium-distance and local services, subject to the stipulation that services affecting more than 2% of the incumbent's income will be denied access. This is in support of the 4th Railway Package, for which Spain received an extension to October 2020 to implement.

The standard domestic night services served by the stated-owned operator RENFE were displaced by the high-speed services in the 1990's and 2000's. The services connecting with France, Italy and Switzerland were cancelled when the high-speed line between Spain and France was opened at the end of 2013.

The only night services that remain in operation are the high quality Trenhotel that RENFE runs as a commercial service. The routes offered by Trenhotel are two domestic routes (Madrid – Galicia and Barcelona – Galicia) and two international routes (Madrid – Lisbon and Lisbon – French border). However, all of them have been put on hold during the Covid pandemic and it is not clear whether they will continue in the future.

However, some open access Night Train operators are considering opening connections with the Iberian Peninsula. In 2024 Austrian OBB announced their plans to launch a Zurich – Barcelona night train service and the French company Midnight Trains plans to launch connections from Paris to Barcelona, Madrid and Porto.

3.2.1.1.3. Belgium

Following the 4th Railway Package, the Belgian rail market has been fully liberalised since 1st January 2019. However, the passenger rail market has not seen much competition, especially in the market for PSO services, suggesting the existence of technical, economic or operational obstacles.

In Belgium, there is only one railway undertaking (SNCB) who provides PSO services. Therefore, there is currently no competition in the market. Everything is organised through a PSO-contract, concluded by the state.

In addition to SNCB, which provides a very limited amount of commercial passenger transport services, THI Factory (Thalys) and Eurostar are active on the commercial international passenger railway market. The latter two provide – for the time being – services on different lines and are therefore not in direct competition with each other; Eurostar provides services to London, THI Factory has lines from/to Paris, the Netherlands and Germany.

Currently, there are no night train services in Belgium. A partnership between Moonlight Express, European Sleeper and the open-access operator Regiojet announced plans to launch the Night Train route Brussels – Amsterdam – Berlin – Prague. Additionally, the French open-access operator, Midnight Trains, plans to launch connections from Paris to Hamburg, with a stop at Brussels, in 2024.

3.2.1.1.4. Netherlands

The EU rail liberalisation agenda has not had much impact in the Netherlands so far. The vast majority of passenger services in the Netherlands, both regional and long-distance, are operated by Netherlands Railway (NS) under a Public Service Contract with the government. This PSC specifies in detail the services to be operated, controls and targets on journey growth, seat availability, punctuality / reliability, customer satisfaction, fares, frequencies and requirements for financial reporting. It also specifies particular improvements including rolling stock replacement programmes.

The most recent PSC was awarded in 2015 and was a Direct Award to NS, funded for 10 years. No competition to run the PSC was undertaken. The PSC includes all types of services in the Netherlands, including high speed services. It is understood that the operator, NS, pays a dividend to its owner, the Ministry of Finance.

Currently there are no night train services operating in the Netherlands.

3.2.1.1.5. Sweden

Sweden was one of the early adopters of EU rail legislation and is one of the most liberalised markets in Europe. It currently has a mix of open access operation for commercial services (largely on long distance lines) and competitive tendering of non-profitable services.

For regional rail services the responsibility for tendering was passed to the 21 Swedish Passenger Transport Authorities (PTAs) in 1988. The first non-commercial Passenger Service Contracts were then put out to tender from 1989-90. The Passenger Service Contracts are typically let on a gross-cost basis of between 5 and 10 years. In recent years some PTAs have changed the basis to include within their contracts incentives to grow passenger numbers. The PTAs specify regional passenger services. In the tendering process, the PTA usually sets an overall service pattern (for example peak / off-peak frequency) and bidders have to respond with a detailed timetable.

The state-owned operator SJ runs around 60% of the country's passenger mileage that is operated under Passenger Service Contracts, while other operators in the market include Arriva, Transdev, MTR and domestic operator Tågkompaniet.

For long distance services a different model is in place. Sweden has been open to open access operators since 2009, and long-distance services are generally operated on a commercial basis by open access operators. This has resulted in the state operator SJ operating services on key routes with competition from others. It is estimated that currently 30% of services between Stockholm and Gothenburg are operated by MTR and around 15% of the Malmo-Stockholm services are operated by others.

There are some unprofitable long-distance routes and these subject to Passenger Service Contracts. These are tendered by the Ministry of Enterprise and Innovation or more generally directly awarded to SJ.

The state-owned operator SJ runs a network of night services (SJ Nattåg) under a PSC contract. Along with the UK, Sweden is the only European country that has a service contract covering night services only. The PSC only specifies the minimum number of services, giving the operator the freedom to decide the final timetable, fares and rolling stock used.

Swedish transport authority Trafikverket tendered international night services PSCs in 2020 for the routes Stockholm – Hamburg and Malmö – Brussels. SJ was awarded the Stockholm – Hamburg route, which they will start operating in 2022 as SJ EuroNight. However, no one applied for the Malmö – Brussels procurement.

An open access operator, Snälltåget, also runs night services in Sweden. Snälltåget has been operating services since 2007, both domestic and international (to Berlin).

3.2.1.1.6. Germany

In Germany there is also a difference between how regional and long-distance services are operated.

For regional passenger rail services there is a tendering system in place for Public Service Contracts. The responsibility for tendering sits with the individual States, whereby they can tender services directly or devolve the responsibility to Passenger Transport Authorities at a local level. In total there are 27 'Competent Authorities' in Germany, either States or PTAs, who have the responsibility for setting service specifications and running tenders for them. There is no standardised contract for rail operations and each State/PTA is free to let contracts according to their own needs and procedures. Particular differences include the degree to which potential operators are free to define their own rolling stock strategy and whether the contracts are gross cost or net cost.

In June 2017, there were around 300 Public Service Contracts in operation for regional services, with around 180 of these in place with the state operator, DB Regio. A number of other operators are in the market, including National Express, Abellio, Transdev, Keolis and Netinera (Italian State Railways).

In contrast, long-distance passenger services are operated on a commercial basis and are not subject to public service contracts. The long-distance services are almost exclusively operated by the state operator, DB, which suggests that there are technical, economic or operational obstacles preventing market entry for competitors. The only current competitor to DB is Flixtrain, which runs typically just one or two trains a day between Cologne and Hamburg and between Stuttgart and Berlin. In theory, decisions around longer distance services are in principle made on a commercial basis by DB, but, in reality, are subject to considerable political oversight and discussion.

Deutsche Bahn (DB) closed its City Night Line network, which included domestic and cross-border night trains, in December 2016. This was partly the result of Germany federal structure, which sets the capacity to set PSOs to the *Länder*. As a result, all long-distance services crossing more than one *Länder* must be run on a commercial basis, which led to DB's decision to cancel all night services. There are, however, still a number of Night Train services in Germany. These are run by the state-owned Austrian operator ÖBB, as part of its Nightjet network.

3.2.1.2. Night trains

In the discussion above on passenger services in the six countries being examined for benchmarking there are a number of common themes emerging on 'Night Trains'. These are discussed, Europe-wide, in more detail in this section.

The number of night services in Europe has diminished significantly in the last decade. The recent EC report (2020) '*Long-distance cross-border passenger rail services*' (EC Cross-border Services report) identifies the reasons for such decline as:

- Changes in infrastructure, particularly the opening of new high speed train lines that allows operators to introduce faster day services instead of night services.
- Difference in gauges is an infrastructure barrier to cross-border services which may impact on the decline in Night Trains. Delivering the required infrastructure for rapid re-gauge requires a high level of agreement between Railway Undertakings, Network Managers and Competent Authorities.
- Infrastructure charges, which may be too dear for a night service, making it commercially unviable. However, the EC Cross-border Services report suggests that this could '*contravene the requirement, in Article 32 of Directive 2012/34/EU, that the level of charges shall not "exclude the use of infrastructure by market segments which can pay at least the cost that is directly incurred as a result of operating the railway service, plus a rate of return which the market can bear."*[16]
- Rolling stock, the majority of the trains withdrawn from service have not been replaced. In many cases this is due to the loss of carrier trains, which allowed adding portions of night trains to existing formations. Countries that have introduced a significant number of high-speed services converted many of their day trains into fixed-formation trains, reducing the scope for sharing locomotives with night trains.
- In the case of cross-border services, rail reform in Europe has reduced the ability of Railway Undertakings to reach bilateral agreements for extending services across borders. The number of parties required to reach agreement has increased, including one or more Railway Undertakings, two Network Managers and, if PSO support is provided, at least one competent authority.
- Commercial pressure may have focused the interest of commercial Railway Undertakings on the better financially performing services. Simplifying operations may also have had an impact.

[16] EC (2020) 'Long-distance cross-border passenger rail services', page 12.

- Many dedicated high-speed lines cannot be used by night trains due to technical specifications and / or safety rules. This situation curtails the possibility of extending the distance covered by night trains and the ability to introduce new longer services.

The EC Cross-border Services report identifies that while the total number of cross-border rail services has remained stable between 2001 and 2019, there has been a shift from night trains (down by 65%) to high-speed trains (up by 95%).

3.2.1.3. Summary

The review of the six European countries shows a mixed picture with regard to the level of competition within each country. There are obviously some nations which haven't moved far in the direction of liberalisation as yet but there are some emerging lessons from those that have, which we can look to apply to RB. These can be examined by the type of service being tendered.

For regional passenger services, those that have not been awarded to the State Operator as a Direct Award, have been awarded through the relevant authorities tendering Passenger Service Contracts (PSCs). This is likely to be a reflection of the fact that these services tend not to be commercially viable and thus require a subsidy. In this instance 'open access' operation is not an option, so PSCs are the only tool public authorities have to deliver them, without incurring State Aid issues. The authority effectively derives value through competing the contracts. This is in line with the EU legislation which effectively imposes PSCs as the only available option for commercially non-viable services.

For longer distance services and high-speed services the picture is more mixed. In some countries, particularly in Belgium and the Netherlands, long-distance and high-speed services are wrapped up in the PSC that has been directly negotiated with the State railway, although there are commercial international high-speed services that run through Belgium. In Germany, high-speed services are in theory operated as commercial services but there is minimal competition to the State railway. In Sweden, for the inter-city market, and in Italy, for some high-speed markets, there is competition on the tracks provided by open access services. Interestingly, Spain has recently allowed competition for high- speed services through competing a framework, which is allowing competition on the tracks but through a number of PSOs.

For Night Trains, the picture is changing. These services have generally been provided as part of an overarching PSC, usually agreed with the State operator. These services have generally been disappearing over the past ten years, mainly due to the provision of high-speed services as competition. Very recently, however, a number of open-access operators are looking to start operating services across Europe, although it is too early to tell whether these will be a success or not. It is understood that there is currently a deep-dive study into Night Trains being run by PRIME, that is due to report later this year. This will be important for RB, and the three nations states, to examine once it is published, to understand any potential new measures being proposed to stimulate the market.

3.2.2. Rail Baltica – Potential Passenger Services

The Rail Baltica client has specifically asked for 4 service groups to be examined for potential passenger service contracting models. It is important to understand these because the level of service and how fixed this is, the level of subsidy (and whether they are international or national only) will have an impact on the choice of the type of contracting model.

The potential passenger service groups are:

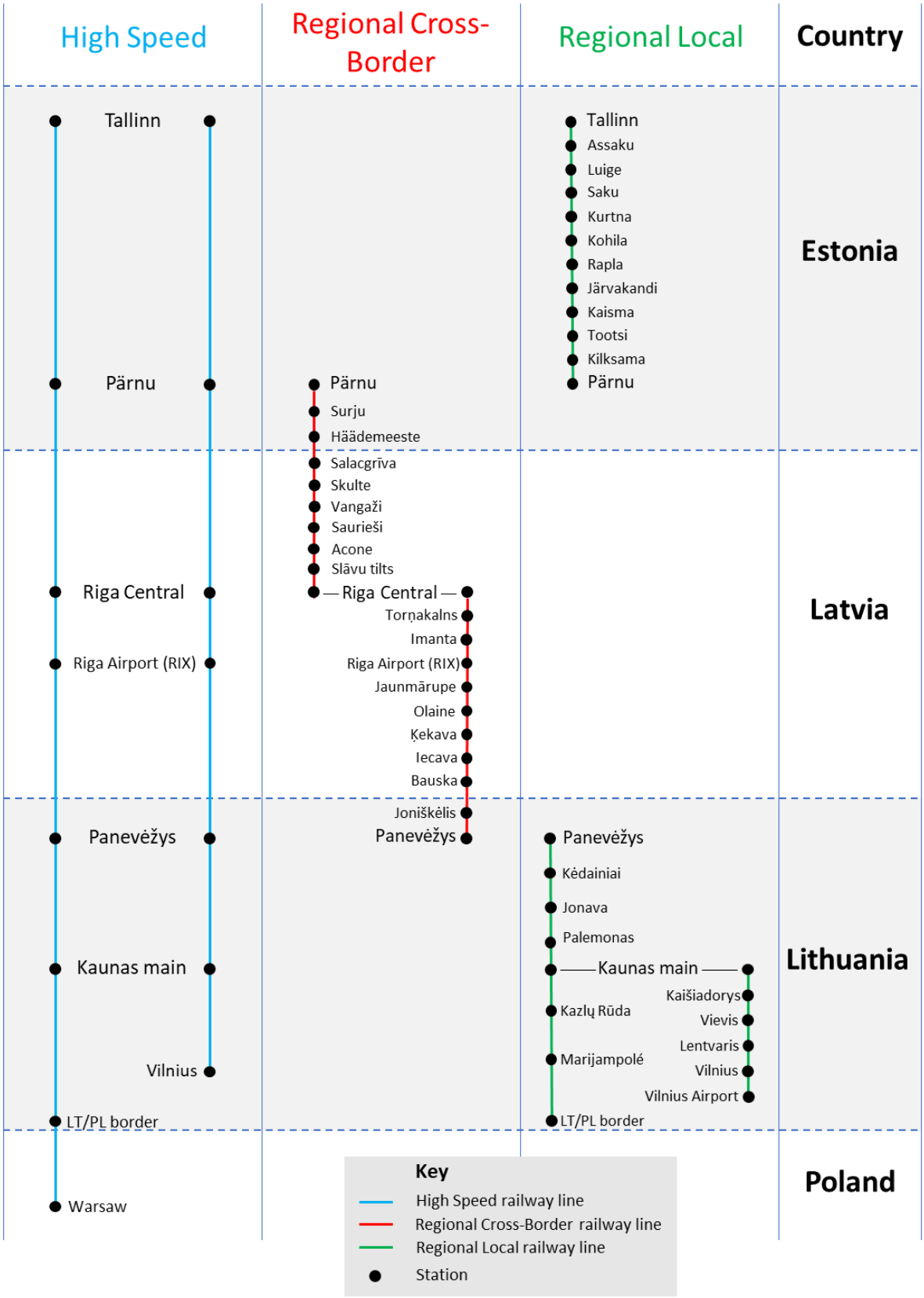
- High Speed Rail.
- Regional international/cross-border services.
- Regional local.
- Night Trains.

These categories are essentially to draw on experience in what RB Rail see as their main service categories. RB Rail have had some work undertaken on services to be operated and this is summarised in the document, 'Rail Baltica: Preparation of the Operational Plan of the Railway – Final Study Report (November 2018).[17] This

[17] Since this report was published the operating plan for some services has been subject to further debate. The Parnu – Riga service may be extended to Jaunmārupe, but this will not impact on the classification of this service as shown in the report.

document outlines the operational plan for the entire railway and includes the current thinking on services that will run on the RB infrastructure. These services can be sub-divided into the four categories highlighted above. The service plan is shown in diagrammatical form in **Figure** 3-2 and described in the remainder of this section.

Figure 3-2 - Rail Baltica service plan by service type



3.2.2.1. High Speed Rail

The flagship service on RB is the international high-speed services that will run through the three Baltic States and also through to Poland. There are effectively two permutations on this service and these are summarised below:

- Tallinn (Estonia) → Pärnu (Estonia) → Riga (Latvia) → Riga International Airport (Latvia) → Panevėžys (Lithuania) → Kaunas (Lithuania) → Poland
- Tallinn (Estonia) → Pärnu (Estonia) → Riga (Latvia) → Riga International Airport (Latvia) → Panevėžys (Lithuania) → Kaunas (Lithuania) → Vilnius (Lithuania)

Any decision on selecting contracting models will necessarily need to be coordinated by the three (and four) countries involved.

3.2.2.2. Regional International/Cross-Border Services

In addition to the flagship international high-speed services there are also some regional services, which stop at more local stations, that cross international boundaries. These are:

- Pärnu to Riga. This service runs from Pärnu in Estonia through to Riga in Latvia, crossing the border between the stations of Häädemeste and Salacgrīva
- Riga to Panevėžys. This service runs from Riga in Latvia through to Panevėžys in Lithuania, crossing the border between the stations of Bauska and Joniškėlis.

Again, any decision on selecting contracting models will necessarily need to be coordinated by the countries involved.

3.2.2.3. Regional Local

A number of regional services are also identified that operate solely within a single country, thus not crossing any international boundary. These are:

- Tallinn to Pärnu. This service runs entirely within Estonia.
- Kaunas to Vilnius Airport. This service runs entirely within Lithuania.
- No Latvian services have been proposed to operate with Latvia only

In these cases, decision-making on selecting contracting models could be retailed within a single country.

Finally, there is a service identified to run within Lithuania, which has an endpoint specified as the Lithuania-Poland border. It may be that this service is actually intended to cross this border, in which case this would need to be considered in the Regional International/Cross-Border services. This service runs from Panevėžys through a number of stations, including Kaunas, through to the Polish border.

On these Regional Local services only a single country is involved so decisions on service contracting models could be taken unilaterally by that single country. The implications of this will need to be considered by the three nation States involved, probably in consultation with RB Rail.

3.2.2.4. Night Trains

The operational plan does not outline specific service configurations for Night Trains but there is potential to run services from the Baltic States through to Warsaw and potentially Berlin overnight, so these will need to be considered. This category is obviously similar to the high-speed category in decision-making terms as it could cross four (and even five) boundaries.

3.2.3. Considerations for Passenger Service Contracting Models for Rail Baltica

3.2.3.1. Implications of EU Legislation

The existing, and forthcoming, EU legislation with regard to service contracting models for passenger services was discussed in detail in section 3.1 of this document. Section 3.1 also outlines the recent Action Plan issued by the EU, which outlines current thinking and likely future legislation.

As discussed in section 3.1 the Fourth Railway Package legislation, which should be fully implemented by 2023, effectively offers Competent Authorities two methods for contracting passenger services:

- ‘Open Access’. In this scenario a qualified Railway Undertaking is able to set up and run services in any country in the EU. In this situation this effectively means that there is direct ‘competition on the tracks’ for passengers. This scenario will only arise for commercial services, where the Railway Undertaking can make a profit, as there is no public subsidy involved. It is also worth noting that the legislation specifically mentions high speed rail services in this context
- Public Service Contract (PSC). In this scenario a public sector body sets up a competition for the selection of a suitable operator. This is often known as ‘competition for the tracks’. This usually involves an operator running a concession or a franchise on behalf of the authority. This is generally applied where there is the requirement for a public subsidy to run the services.

These two options are thus the options available to consider for the service contracting model for the four different service types under consideration for RB. It is apparent that the requirement for a subsidy, or not, is the key decision-point in selecting the appropriate method. Services that are likely to require a subsidy are not going to attract a potential ‘open-access’ operator as the operation will not be commercially viable. In this instance, the legislation essentially pushes the Competent Authority down the PSC route as a way to ensure competition and maximise value from the services (albeit acknowledging that a subsidy will be required).

It should be noted that it is still possible for a Competent Authority to issue a Direct Award, but these are only for exceptional circumstances. These contracts have been utilised in Europe, as seen in our benchmarking exercise, but these have effectively been awarded to the state-owned incumbent operator and will be much more difficult to implement post enactment of the Fourth Railway Package legislation. Whilst there are incumbent operators in each of the three countries, RB, being a new piece of infrastructure, does not have any incumbent operators, which is likely to make it even more difficult to directly award contracts on transparency grounds. It is not recommended that a Direct Award option is pursued as such a situation is clearly moving against the spirit of the EU legislation.

3.2.3.2. European Experience

A benchmarking exercise was undertaken of six European nations to determine how they are contracting the provision of passenger services for different service groups. The picture from Europe isn’t completely clear as different countries are at different stages in the liberalisation of passenger services but there are some emerging lessons from those that have started to liberalise, which we can look to apply to RB.

European experience would tend to suggest that the high-speed and/or long-distance commercial services are more likely to attract ‘open access’ or commercial operators, as they are more likely to be profitable. Shorter distance and Regional Local services in almost all cases, tend to be operated through a Public Service Contract, as they require a subsidy. The position on ‘Night Trains’ is interesting, with services operated through a PSC generally disappearing over the past 15 years, but a number of open access operators currently starting up across Europe.

3.2.3.3. Importance of Revenue and Cost Data

The profitability, or otherwise, of services is therefore a key determinant in deciding which service contracting model to pursue. It is therefore recommended that the key next step to determining potential service contracting models, is to construct a detailed Comparator Model, including a breakdown of all four service groups, to determine likely levels of profitability.

We are aware that a Business Case for the RB project has been produced, which could give some indication on the level of profitability at an aggregate level, but this document is likely to be out of date now, particularly as it pre-dates the Covid-19 pandemic, which has had a major impact on rail travel throughout the world. It is our understanding that there are plans to refresh the Business Case soon. In any event, the Business Case rationale is to promote the overall economic case for the project. A Comparator Model, by contrast needs to be constructed at a more disaggregate level, with a commercial standpoint, so is by nature a different model. It is understood that RB Rail currently have consultants producing demand and revenue forecasts for the services outlined in the Operational Report. These forecasts are likely to be a key element in producing robust revenue lines for the service groups under consideration and it is recommended that suitable sensitivity tests are undertaken to determine a realistic range of likely revenues.

The current position with regard to operational costs of running the rail services is not known but if no work is being undertaken it is recommended that cost models be built to reflect the costs of running services for the four service groups.

It must also be recognised that two key elements will have a significant impact on the operational cost base through the setting of Track Access Charges to the Infrastructure Manager and the handling of the potential provision of Rolling Stock.

The revenue and cost elements should be brought together into a Comparator Model. This model will expose which, if any, services are likely to be profitable, and enable scenario planning to take place to determine under which circumstances the service groups can be profitable. This task will then provide feedback into decision-making around setting the levels of Track Access Charges, for example. The other purpose of the Comparator Model will be to determine the likely level of subsidy required for operating the different services. This will allow the full cost of operating each service to be determined, which may feedback into the service levels being offered, and will also allow the impact of policy choices on the subsidy level to be determined. Thus, if it is determined that it is more important that the railway provides a public service through maximising passengers rather than revenue, for example, the impact of this decision on the public purse can be seen.

3.2.3.4. Lack of Historical Revenue and Cost Data

Given the importance of cost and revenue data to any decision-making on passenger service contracting models, there is the additional complication that whilst there are railways in the Baltic States, RB itself is a greenfield railway project, which will create new opportunities for travel throughout the Baltic States and into Poland. One of the key factors that the future operator will face, therefore, is a lack of historical information on costs and revenues of the services. This obviously applies to all four of the service types that will be run. This results in the Comparator Model being more difficult to create and perhaps means that more emphasis should be placed on sensitivity testing in the revenue and cost elements of the Comparator Model to test the ranges of the likely profit/subsidy lines.

An additional issue with new infrastructure, particularly infrastructure that provides new journey opportunities as in the case of RB, is that demand takes a few years to build up. This is often described as a ‘Ramp Up’ of revenue. This is because it takes people a while to respond to new journey opportunities, as it provides the opportunity to move houses or employment. This means that it is particularly difficult to predict demand in the early years but that there is likely to be a steep build up in demand over the early period of operation.

This lack of historical data will provide a challenge for any potential open-access operator, or operator pursuing a PSC which has revenue-risk incorporated, as there are no parameters in which to undertake their revenue and cost forecasts. Cost parameters tend to be more fixed, however, so they should be more straightforward to predict, particularly as railways already operate within the Baltic States. This lack of data may result in potential operators factoring in more risk into their decision-making process, which could result in a reluctance to enter the market. Equally any potential operator could be looking for a higher level of guarantee from the authority before entering the market, due to the uncertainty involved.

3.2.3.5. Institutional Set-Up

The institutional set-up will be critical, regardless of which passenger service contracting model is adopted. Given the pan-national nature of the railway it will be important that all decisions on track allocation and path availability, including a strict hierarchy of services, are taken at a three-nation level. This will effectively determine the availability of paths for ‘open-access’ or PSO services and mean that the railway operates most efficiently. It will also mean that it is clear for each service type how many paths are available and thus what sort of train service can be operated.

The number and form of the ‘Competent Authorities’ for letting any PSCs will also be important and this is discussed in more detail in the section on PSCs below.

3.2.3.6. Market Sounding

Before the RB project goes too far along the path of determining the type of passenger service models to be adopted it may want to consider a market sounding exercise with potential operators. This would probably best to take place once a better indication of the likely profitability, or not, of the service groups is determined. These sessions can gauge likely interest in the project but can also be used to determine what elements the market will be looking for to operate services. This can be at the ‘open access’ versus PSC level, but also can be used to probe specific aspects around both of these service contracting propositions. As an example, in a PSC, this exercise can be used to determine whether potential operators are likely to be keen on taking revenue risk, and if they are, what sort of guarantees they will require around it. It is considered that this will be a crucial element in determining the type and form of service contracting model.

Feedback from market sounding will be crucial in understanding the demand for open-access operations and in formulating passenger service contracts. Early knowledge of what any potential operators think about emerging propositions is extremely important. These will need to be taken into account to ensure a healthy interest in operating services, which in turn will result in better value through competition.

3.2.3.7. Specific Considerations for 'Open Access' Operations

The steer from the EU, and indeed the evidence from existing European operations suggests that this is most likely to be an option for the high speed and long-distance services. Whether this is a realistic option, or not, for the RB passenger services, will depend to a large extent on the Comparator Model work, but also on decisions taken on Track Access Charges and Rolling Stock provision.

In considering an 'open access' model for the high-speed services, the three nations and RB Rail will need to decide how prescriptive they intend to be in delivering the level of service in its Business Case. As stated previously, open access operators are commercial enterprises, so they will only deliver services that are profitable. The current profitability, or not, of the potential services is not yet known, but it is unlikely that each of the high-speed services currently envisaged, will be so. This could therefore leave a limited service operating on what are effectively the flagship RB services. This could be embarrassing given the amount of money spent on the provision of new infrastructure and also result in the scheme not realising its benefits.

Any decision on allowing 'open access' services will also be complicated by the lack of historical data, and the fact that there is likely to be a 'ramp up' in demand as the scheme becomes established. This could result in limited take-up for 'open access' services so a market sounding exercise will be key to determine what may make such service provision attractive.

It may be that the three nations decide to operate the international high-speed services through a PSC in the early years, to establish practices and allow the market to develop. This may then allow open-access to be considered after the initial years as there will then be more certainty around the market. An alternative to 'open access' competition for these high-speed services in the early years of operation, could also be considered, by running a framework along the lines of the recent Spanish model. Such a framework could be set up to select multiple operators on the route and determine a minimum number of paths that the operator will be required to operate. On this basis, an acceptable service level could be delivered and competition on the tracks could be ensured through multiple operators.

There is a current trend for 'Night Trains' to be provided on an 'open access' basis across Europe. These services could also be considered for 'open access' operation on RB line. The main determinant here will be how key these services are considered to be for the entire service provision, as leaving this to the market may result in no service being provided. A key consideration here will be how many paths are available and how these fit in with the maintenance windows for the Infrastructure Manager, as effectively the services will have no opportunity to re-route given that RB is the only north-south route through the three countries.

Other tools to encourage 'open access' operators to provide 'Night Trains' may also need to be considered. The association of European open access operators, AllRail, is calling for the reduction of Track Access Charges for 'Night Trains', arguing that these are marginal services so should be charged at a marginal rate. It may be that the upcoming PRIME deep-dive study provides further items for consideration with regard to providing Night Train services.

3.2.3.8. Specific Considerations for Public Service Contracts

The steer from the EU, and indeed the evidence from existing European operations suggests that this is most likely to be the option to be pursued for the Regional Local and some Regional Cross-Border services. These service groups are likely to require subsidy, although this will be determined through the Comparator Model work. The level of Track Access and Rolling Stock charges will also be a consideration in this.

A key part of establishing a competition for a PSC is a specification piece, effectively so the awarding authority can determine exactly what it wants to buy (for example, the level of service provided) and at what level of cost. The institutional arrangements will, therefore, be a key consideration in determining how PSCs are taken forward. The awarding of a PSC falls to a 'Competent Authority', which is effectively an organisation which has jurisdiction over a specified area. This will be difficult for RB as many of the services cross national jurisdictions, so some form of collaboration of Competent Authorities will be required. For a PSC that crosses boundaries then it would make sense that the collaboration of Competent Authorities is comprised of organisations from the countries that the services operate in, as the nations will need to have a say in determining the specification of services within their national territory, particularly as a subsidy is likely to be required. Given that there are currently local services proposed for crossing all of the boundaries, rather than have a number of collaborations

of 'Competent Authorities' (so Estonia/Latvia and Latvia/Lithuania) letting contracts or whether a single entity should be established at the three-nation level. Even in the case of a single letting entity, however, there will be a requirement for the discussion of subsidy to take place between the nations effected. For services within a single country then it may make more sense for that country to comprise the 'Competent Authority' to let the contract.

The difficulties in establishing cross-border PSO obligations is recognised by the EU and was highlighted as a topic in the recent 'Action Plan to Boost Long Distance and Cross-Border Passenger Rail'. This document had a specific topic to examine PSO obligations to promote sustainable cross-border transport. Within this heading there is a specific action to publish in 2022, interpretative guidelines for applying the Land PSO obligation to long distance and cross-border rail passenger services. The aim of this action is to allow competent authorities to cooperate and establish cross-border PSOs. The outcome of this action will be very important to the Baltic nations in establishing cross-border passenger services.

There is a precedent for competent authorities collaborating from Germany, in the Verkehrsverbund model. This model effectively provides collaboration for different government jurisdictions in the provision of passenger services through the implementation of regional public transport associations. These Verkehrsverbund have responsibility for integrating services, fares and ticketing, in addition to coordinating public transport planning, marketing and customer information throughout the metropolitan areas. This model looks at services operating only within Germany, so obviously does not have the national cross-border issue to face but could be worth further examination to determine how the collaboration works.

Regardless of the model adopted for the collaboration of competent authorities it will be necessary for the track allocation and pathing to be determined at the three-nation level, as the number of available paths for each potential PSC should be determined at the outset to ensure the most efficient use of infrastructure. This allocation should then set the framework for the development of a Train Service Specification in the PSC.

The use of a Comparator Model will play a key role in the development of a PSC specification, as it will allow the authority to determine the likely cost of what it wants to buy through the contract. This will be important in any train service specification plus the addition of any quality add-ons that it wishes to specify.

The term Public Service Contract is an overarching one with a range of contract types, and decisions to be made within it. The future IM should consider the type of contract it would like for each of the service groups that it wishes to run. A key consideration, for example, is whether the PSC incorporates Revenue Risk or not, Letting the operator take revenue risk is likely to result in an operator that is more likely to drive revenue but is likely to result in a more expensive contract as they will build in more risk and require a bigger profit margin. A contract without revenue risk is less risky, with less chance of operator default, but with less incentive for the operator to drive revenue. Other considerations for the PSC are whether the contract is highly specified (input driven) or concentrates on outputs, with the operator left with more freedom as long as it delivers. The market sounding exercise will be a key opportunity in exploring these issues.

3.3. Work Package 2.2 – Critical Review of Service Contracting Models for freight Services

3.3.1. Benchmarking of Service Contracting Models across Europe

Atkins undertook a broad search for evidence of service contracting of freight services. Those few contracts that were found are quite distinct from the public passenger service contracts. The nearest that could be found were where government have a contract with freight RUs for the movement of freight by rail as part an approved arrangement to prevent the freight being carried by rail.

Rail freight support grants:

EU legislation allows governments to establish schemes to support rail freight operations but such schemes need to be available to all operators and managed in a transparent fashion. The rules governing these schemes are governed largely by EU state Aid legislation.[18] Article 10 of Directive 2001/14/EC "*explicitly allows Member States to put in place a compensation scheme for the demonstrably unpaid environmental, accident-related and infrastructure costs of competing transport modes in so far as these costs exceed the equivalent costs of rail…. which harmonises methods for calculating infrastructure access charges within or across land*

[18] https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52008XC0722(04)

transport modes." In other words, any financial support needs to linked directly to environmental benefits of using rail. The legislation goes on to say: "*both for aid for rail infrastructure use and for aid for reducing external costs, the Member State has to provide a transparent, reasoned and quantified comparative cost analysis between rail transport and the alternative options based on other modes of transport. The methodology used and calculations performed must be made publicly available*."

There are other limitations. The Commission sets some maximum values which limit any grants in terms in terms of size ("proportionality"). In effect this limits TAC reductions to "30 % of the total cost of rail transport, up to 100 % of the eligible costs – (i.e. the TAC charge)" and limits direct grants for the environmental benefit to "30% of the total cost of rail transport, up to 50 % of the eligible costs – (i.e. the environmental benefit)". Any grant whether through a reduction in TAC or "aid for reducing external costs (i.e., the environmental benefits) the aid has to be strictly limited to compensation for opportunity costs connected with the use of rail transport rather than with the use of a more polluting mode of transport." The process for calculating that and applying that also needs to be transparent. The legislation states: "*At any rate, where the aid recipient is a railway undertaking it must be proved that the aid really does have the effect of encouraging the modal shift to rail. In principle this will mean that the aid has to be reflected in the price demanded from the passenger or from the shipper, since it is they who make the choice between rail and the more polluting transport modes such as road.*"

The EU has shown a willingness to police these agreements, even during Covid.[19] In particular there has been close scrutiny to ensure these support grants are available to all customers.

3.3.2. Rail Baltica – Potential Freight Services

The grant schemes described above are instituted by national governments to level the cost of road and rail freight. Most commonly such schemes are used, in effect, to reduce the level of Mark Up being paid on particular routes (Italy) or to support a policy decision to purchase reduction in road freight movements (Sweden). The first approach is not recommended for RB.

If the national governments individually or collectively wish to reduce the cost of rail freight operations to level the commercial battle with road they can agree to keep TAC to levels close to the Direct Cost rather than allow a higher Mark Up and then institute a policy to subsidise RUs directly. Such an approach would be administratively simpler and be transparently impartial. If at a later stage the national government wished to further grant aid rail freight they would be able to do so, within the rules, from a clearly defined base case that would make that simpler.

The future IM (or the national governments) might wish to offer early support to rail freight services to allow services to become established. In order for services to have support for an initial period, it would be allowable to offer wagons or a commercial incentive (subject to be of no greater benefit than the cost of the environmental impact and only in so far as required to balance the total cost with road). However, the key barrier currently to freight RUs is the contractual and commercial uncertainty of the Rail Baltica project. Before addressing whether or not freight RUs might need a grant, freight RUs need to know the cost of their TAC and the likely availability of paths.

[19] https://www.railwaypro.com/wp/italy-granted-approval-for-public-funding-of-rail-freight-transport-project/

4. Work Package 3 – Rolling stock Acquisition Models

4.1. Overview of Work Package objectives

This section provides analysis of the options, lead times and recommendations for ensuring rolling stock is available for use on the Rail Baltica route. The analysis considers the political, strategic and regulatory environment for rolling stock acquisition, the market for new and used rolling stock, international precedents and the available models for public and private ownership.

Drawing on these considerations, a suggested way forward is proposed for each of the key types of rolling stock required (high speed/cross border and regional passenger trainsets, freight locomotives and wagons and on-track maintenance plant).

4.2. Policy and Strategic Context and Assumptions

The new railway is expected to require, as a minimum, rolling stock encompassing high speed, regional cross border and regional local passenger services and freight operations. There will also be a need for rail mounted maintenance equipment.

Rail Baltica will cross three countries and run for around 1000km. The scheme is expected to open in phases, with new sections beginning to come online from 2026/27 and the full route being open in around 2030.

At this stage it is not known who will operate services, but the following assumptions are being made.

- International/cross border – Either fully open access or a tendered package of rights with one or more operators having the right to exploit a set number of paths.
- Regional/national – Operated by a number of geographically discreet operators under tendered public service contracts (PSCs).
- Freight – Fully open access.

It is further assumed that the specification of the railway will be fully Technical Standards for Interoperability (TSI) complaint and common across its full length. It is noted however that it is expected that the design will be in accordance with the planned updated Command, Control and Signalling (CoCoSig) TSI, with communications based on the Future Railway Mobile Communication System (FRMCS) standard rather than Global System for Mobile – Railways (GSM-R). This will mean that existing TSI compliant roiling stock will require additional equipment fitted to operate on the route.

It is also assumed that the route will be operated under a common regulatory and access/charging regime (though it could be constructed as three separate infrastructure management companies), with a single set of process for applying for access and deploying rolling stock and a single central organisation managing the processes.

4.2.1. EU Regulatory Framework for Rolling Stock Ownership and Control

Europe has sought to standardise the European Rail network in an effort to pursue interoperability on the European rail networks and move to a state of one rail area. Further to this, the EU wants to introduce increased competition in the EU rail market. To this extent national rail companies have gradually seen their monopolies rolled back in favour of increased access for private sector operators. Vertical integration is being broken up, for example SNCF of France has been split into two companies, one that owns the track and one that owns and runs the trains (although the two are still very closely linked). This is reinforced by the regulations introduced in the Forth Railways Package in 2016 will allow the EU to:

- Challenge and sanction parts of vertically integrated rail businesses that place obstacles in the way of competitors.
- Take responsibility for authorising rolling stock use on a network through the European Railway Agency instead of the network owner.
- Take responsibility for issuing safety certificates for rolling stock and operators.

The EU is also pushing for all railways and rolling stock to eventually be equipped with European Railway Traffic Management System (ERTMS) compatible signalling systems, thereby allowing interoperability of stock between all signalling regions. Further looking to increase interoperability, the EU is keen to standardise the vocational qualifications of drivers and facilitate cooperation between fully independent national safety authorities of different EU states.

This approach in standardisation is mediated however with regards to the Baltic states. As the Baltic states operate predominantly using 1520mm track gauge, the EU has been prepared to wave its centralisation of operating a safety certificated and defer to the Baltic rail authorities when it comes to these networks. This also applies to states with standard gauge networks who share a significant amount of rail traffic with countries outside of the EU.

In the case of Rail Baltica it should be noted that this level of autonomy might not be granted as Rail Baltica is a standard gauge network that will operate services originating and terminating either within the Baltic states or between the Baltic states and Western Europe.

It can be generally assumed that.

- The IM will not be allowed to own or operate the trains that run on the Rail Baltica line unless the EU can be assured that this level of vertical integration will not be detrimental to competition on the new line.
- The rolling stock procured will be fully interoperable with other EU networks and meet all the EU TSIs.
- The EU may be keen to try to centralise the safety certification for the rolling stock and operators. However, considering how the EU has allowed the Baltic states more autonomy when it comes to the 1520mm gauge network there may be wiggle room for this.

4.2.2. Rail Baltica Remit

Rail Baltica is being developed and implemented under a joint agreement between the three Baltic states supported by funding from the EU. Development is being led by a jointly owned enterprise RB Rail AS which acts as the project Coordinator with the role commission the design, construction and marketing of the railway. As originally envisaged the Rail Baltica route is seen as an open access railway, as a result, RB Rail AS does not have a specific remit to procure or secure rolling stock for the route. However, as the promoter and marketer of the scheme, they do have a responsibility to the Baltic states national governments to identify issues and potential solutions required to optimise the use of the infrastructure once it is available for use. It is not clear at this stage whether RB Rail AS has the capacity or powers to initiate any rolling stock procurement if it is concluded these are required. The identification of a suitable procurement party will be required if the situation arises.

4.2.3. Participating Country Regulatory Environment and Policy Objectives

All the Baltic states as well as Finland have thrown their support behind the project. All are keen to use it to improve both local links within their own countries and between EU state. As all are in the Schengen area there should be little to stand in the way of achieving these improved links. All have stated their wish to improve multi-modal accessibility and connectivity across the country and into mainland Europe, such as the connection to Riga airport. However, they have also stated their wish to use the infrastructure alongside NATO for military purposes and in 2020 Lithuania launched preparatory work via the Ministry of National Defence.

In general, the Baltic states have appeared to be accommodating when it comes to the regulatory environment for Rail Baltica.

- With regards the regulatory framework, Lithuania currently operates both Russian Broad (1520mm) and Standard Gauge (1435mm) railways and therefore provides an indication of how the regulatory environment for Rail Baltic could work. Currently Lithuania operates a standard gauge line between Kaunas and Šeštokai where it meets the Russian broad gauge network. This route provides a key link for freight coming from Poland to transfer to continue into Russia and The Baltic. While Lithuania itself publishes the legal guidance and regulations for this line, they are closely aligned with EU law and regulations rather than issuing just their own guidance. As Rail Baltica is a cross border EU railway through states that predominantly operate railways of a broader gauge it may simply be easier to allow the EU to regulate the line with regards to safety and operation working through the state regulators depending on the territory the rolling stock is in at the time
- With regards to how the Baltic states may approach working with the EU on regulation one example comes from Latvia where a law been passed to speed the construction of the Latvian section of the line. This is

because Rail Baltica has to comply with a number of Latvian Rail laws that do not apply to other sections of the line. This bill would grant exemptions to the Rail Baltica project and harmonize regulations along the line. This could be an approach taken for rolling stock on the line however there could be issues if change gauge stock was selected which would have to comply with both the Rail Baltica regulations and Latvian rail regulations.

4.2.4. Affordability Constraints

Rail Baltica and the Baltic states are understood to have limited resources to acquire rolling stock directly with the use of outside debt. Moreover, it is understood that there will be a preference that any financing/ownership arrangements for the rolling stock should be off balance sheet, with the states having a preference to limit the use of subsidies. However, it is likely that in order to encourage modal shift it is likely that demand (certainly in the early years after opening) will not support the desired quantum of services on a commercial basis, therefore, will be necessary to provide underpinning support for passenger services, and possible some form of encouragement for freight operations.

4.2.5. Capacity and Capability of Stakeholders to Own and Manage Assets

The Baltic states are assumed to have limited capacity and capability to own/manage rolling stock assets, however it is conceivable that the state railway companies could be custodians of fleets, though the financial capacity to do so could be limited.

4.3. Comparators

Across Europe a number of models for rolling stock ownership and provision for passenger operations have evolved, the following comparators can be considered.

4.3.1. Cross Border Operations (TBC)

With respect to cross border/international services three operators are of interest

4.3.1.1. Eurostar

Eurostar – Eurostar was originally set up as an unincorporated joint venture between the British Railways Board, SNCF and SNCB. While a common rolling stock solution was selected the ownership of the original trainsets was held by the individual state owned operators who financed them with state funds. Since then Eurostar has become a freestanding company, albeit with SNCF as a controlling shareholder and SNCB with a minority stake. Under this new structure additional rolling stock has been added to the fleet, this has been procured on balance sheet financed with commercial debt.

4.3.1.2. Thalys

Thalys – As with Eurostar, Thalys was originally set up as an unincorporated joint venture, in this case SNCF, SNCB and NS. Similarly, the rolling stock was procured by the participating state owned enterprises and operated by the JV. Again, like Eurostar, a formal incorporated business has been established, owned jointly by SNCF and SNCB, however the rolling stock remains under the ownership of the parent businesses. The SNCF and SNCB assets are notionally leased to the operating company, with the two NS owned trainsets being made available under an operating agreement in which NS run the Dutch elements of the service. No new rolling stock has yet been acquired by the business.

4.3.1.3. Trans-Alpine (Cisalpino)

Trans-Alpine (Cisalpino) – Cisalpino was a joint venture incorporated enterprise between SBB and Trenitalia that operated services between the two countries. The business acquired rolling stock on its own balance sheet using funding from its parents. The business has subsequently ceased operations with cross border services run by SBB and Trenitalia separately. For a period of time the business leased its rolling stock back to the JV partners.

Given the issues discussed above with respect to the appetite of the Baltic states to finance and own rolling stock, while a joint venture operating business could be a way forward, it is debatable as to whether the ownership approaches described above could be a model for Rail Baltica.

4.3.2. National Benchmark Comparators (TBC)

It is anticipated that ownership models adopted for national operations may be more appropriate comparators. Using the countries considered for work package 1 the following observations can be made.

4.3.2.1. Sweden

In Sweden the provision of intercity services is largely undertaken by the state owned operator SJ who procure their own rolling stock on their balance sheet using their own capital or national government funding. There are open access intercity operations, the main one being run by MTR. To date they have procured their own rolling stock on balance sheet using commercial debt.

Regional services are run under public service contracts by private operators let by regional authorities. The rolling stock for these services is owned by a 'public benefit' enterprise, Transitio, jointly owned by the regions. Transitio finance and procure fleets on behalf of the regions and lease the equipment back to the authorities, with the operators running the trains under licence. It is not entirely clear which party is responsible for maintenance, though it is assumed to be the operators.

4.3.2.2. Germany

Germany has a broad range of ownership arrangements. Intercity and high speed services are very similar to that seen in Sweden, with Deutsche Bahn (DB) procuring equipment on balance sheet using their own or state grants. There are a small number of open access operations (most notably, FlixTrain) which use leased locos and coaches.

At the regional level each individual Passenger Transport Authority (PTA) is able to develop its own model for rolling stock provision. In many cases, the PTAs require the operators to provide rolling stock, and as DB retain the majority of PTA let operating contracts, and, as with the intercity stock this is generally procured on balance sheet. Other operators however make extensive use leasing arrangements with companies such as Alpha trains holding extensive portfolios of assets. In order to promote competition for the operating contracts, some PTAs provide residual value guarantees for the procurement of new rolling stock that significantly reduces the risk to any lessors. This in turn has attracted the involvement of Lander banks and other financial institutions. A small number of PTAs have taken different views and have sought to either procure rolling stock directly or procure an owner with a guarantee that the stock will be leased to successive operators for the duration of a defined concession period.

4.3.2.3. Italy

The Italian model for intercity services is the same as that seen for Sweden and Germany, with the state operator, Trenitalia, operating the majority of services using directly, on balance sheet owned rolling stock. There is also a significant open access high speed operator, Italo, who procured their fleet on a leasing basis, supported by long term maintenance arrangements with the manufacturer.

Also as with Germany, regional PTAs are open to arrange their fleet policies as they see fit. A large proportion of such services are delivered by Trenitalia or publicly owned regional operating businesses who own the rolling stock on balance sheet. There have been cases where the acquisition of new stock has been financed with debt provided EIB on a green bond basis. There are some reginal concessions run by private operators, but it is understood that rolling stock is almost entirely owned on balance sheet, either by the PTA/regional authority or directly by the operators.

4.3.2.4. Spain

Passenger railway operations in Spain are almost entirely proved by the state owned RENFE who own their own fleets on balance sheet financed by state funds. One notable deviation from this is the introduction of concession based packages of rights on the high speed network. These rights require the two new operators (backed by SNCF and Trenitalia respectively) to provide their own rolling stock. While it is known that Trenitalia examined a leasing option, it is understood that both operators are planning to use directly (on balance sheet) owned equipment.

4.3.2.5. Netherlands and Belgium

These countries have yet to implement the use passenger services contracts to any great extent with the state incumbents (NS and SNCB) operating the vast majority of services using directly on balance sheet owned

rolling stock financed from state funds. It should be noted that some year ago, the Dutch operator, NS transferred their entire fleet to an Irish registered, but NS owned, entity, from which the operating business leased the assets. This arrangement was undertaken for tax purposes and has since been unwound for political reasons. There are a small number of branch lines operated by private concessions in the Netherlands, and it is understood there all own their own rolling stock on balance sheet.

The mix of solutions use across Europe makes it clear there is no 'one size fits all' solution and that solutions need to be adopted and adapted to specific situations. That said, it is possible that a rolling stock owner concession along the lines let by some German PTAs may meet the strategic and policy objectives of the Baltic states.

With respect to freight rolling stock the ownership models are generally pan-Europe. While state owned, and former state owned incumbent operators still hold significant market shares, freight operations are almost universally open access as required under EU regulation. In that context, and as described in relation to rolling stock types, it is seen that freight equipment is either directly owned by operators or leased from portfolio leasing business. There is no evidence of concession-based models being used.

4.4. Required Fleets

4.4.1. Number of Assets Required

At this stage it is not possible to have high confidence in the total rolling stock requirements required for Rail Baltica. The best analysis to date is included in the Rail Baltica Operational Study from 2018, which summarises the forecast fleet for 2036 as follows.

Table 4-1 – Rolling Stock Requirements based on the Rail Baltica Operational Study from 2018

Rolling Stock type	Total no. of trainsets or units (with reserves)
High speed/cross border	23
Night services	5
Regional services	22
Freight locomotives (main line)	34
Freight wagons	140
Track Mounted Plant	36 (plus wagons)

4.4.1.1. Passenger

The Rail Baltica Operational Plan Final Study identified three service types, long distance high speed cross border services, regional services within the Baltic States and long lower speed cross border night/sleeper services. The high-speed services will require trainsets capable of running at up to 249 km/h while the regional and night services are expected to run at around 160 km/h. Moreover, night services can be expected to be locomotive hauled rakes of specialist trailer coaches.

4.4.1.2. Freight (locos and wagons)

Freight on the Rail Baltica route is expected to use modern electric locomotives which will be either four or six axle depending on the trailing weight run. The services can be expected to run at no higher speed than 160 km/h. Rail Baltica have identified that a significant number of shunting locomotives may also be required, however it is considered that the availability of electric locomotives equipped with 'off wire' last mile and shunting functionality (diesel or battery) will reduce this requirement.

4.4.1.3. Maintenance Plant

Track mounted maintenance plant is highly specialised rolling stock required for the ongoing safe operation of the railway. While some of this plant will be passively hauled between worksites, much of it will be expected to run in traffic under its own power. Due to the nature of its application the equipment, working in possession with

the overhead line de-energised, it can be expended to be diesel powered. The equipment that will run in traffic can be expected to operate at speeds of around 120 km/h.

4.4.2. Market Capacity and Appetite for Participation in Procurement

The volumes of rolling stock envisaged by 2026 are relatively modest by international procurement standards for new build equipment, therefore the key issue is not so much market capacity (the global supply of rolling stock will easily accommodate the Rail Baltica fleet requirements), it is appetite for moderate scale orders. However, if new build is required, as much of the equipment will not require significant modification from existing products offered by the supply market, there can be expected to be significant appetite from the manufacturers to supply new vehicles. Some manufactures see orders for less than 100 passenger vehicles as break point where the non-recurring costs associated with each order as being manageable and therefore the point at which order become more economic. However, the limited customisation required here is likely to permit economic prices of smaller orders. For this reason, it is not regarded as necessary to bundle the separate types of required passenger rolling stock into a single order. This in turn will allow the selection of optimised products for each application.

While, as discussed below, the availability of existing passenger rolling stock is likely to be limited and any deployment of such assets will be opportunistic, the fleet sizes being sought would be attractive to the leasing market.

4.5. Product Availability

4.5.1. Technical Requirements and Impact of Any Bespoke Issues (Gauge Switching, Dual Voltage, Multi System Signalling, Passenger Equipment)

It is assumed that the line within Poland between Warsaw and the Lithuanian border will be upgraded to full TSI compliance, in addition to full UIC gauge and common platform heights this means the line will need adapting to 25kV 50Hz ac overhead line power and ETCS signalling (presumably using FRCMS). This means that dual voltage trains will not be required. Therefore, so long as local climatic conditions are considered, rolling stock for Rail Baltica can be based on manufactures standard product platforms (e.g., FLIRT, Desiro, Coradia, Vectron, Traxx etc.) with limited customisation (mainly to address corporate branding and customer experience facilities).

It is noted that there is currently no commercially viable solution for operational movement between the standard gauge (1435mm) Rail Baltica route and the Russian gauge (1520mm) networks in the Baltic states. Moreover, it is considered that demand for through running services (both passenger and freight) will be negligible for some years to come. A further consideration is that procuring rolling stock equipped for gauge changing will be very bespoke, require considerable development and have limited redeployment opportunities, thus rendering it unattractive to third party funders.

For the reasons noted above, no detail consideration has been given to the possibility of procuring rolling stock capable of moving between the two networks.

4.5.2. Existing Fleets

In theory, a ‘vanilla’ TSI specification, should permit the use of existing rolling stock on the fleet, possibly with some modest modification. However, the availability of such equipment for rapid deployment could be quite variable as discussed below.

- High Speed EMUs – It is not believed meaningful volumes of surplus 249 km/h capable multiple units are available that could be deployed on the Rail Baltica routes. It is possible that some mid to near end of life equipment could become available as operators acquire new stock. In this context it possible that trains such as TGVs, ICEs or Pendolinos could come on the market. Three specific opportunities have been highlighted as being of interest to the Rail Baltica project, the PKP Intercity ED250 (Pendolino) fleet, SNCF TGVs and DB ICE 1s.
    - PKP Intercity ED250 – In 2011 PKP Intercity placed an order with Alstom for 20 trainsets based on their 250 km/h capable Pendolino product family (though unlike other models in the family, these were not to be fitted with tilting bogies). The fleet entered service in 2014 and they trainsets have remained in use ever since. The fleet is highly adaptable in that it is equipped for 25kV 50 Hz ac (TSI compliant), 15 kV

16 2/3 Hz ac and 3 kV dc operation and multiple signalling systems, including ETCS. The intercity nature of the fleet would not make appropriate for the initial regional operations, though they would be well suited to high speed cross border services when these become possible around 2029. At this stage the trainsets would be 15 years old, and can be expected to have at 15 – 20 years remaining life. While RB Rail AS have noted that they believe these trainsets could be available for deployment on Rail Baltica, this far out it is unclear whether this is truly the case, and what condition they may be in if, by then, they are surplus to PKP InterCity's requirements. Conversely, given the highly adaptable nature of the fleet, there could be other parties interested in acquiring them, and the cost, to whichever party procures them, could be in excess of €10m per trainset.

- SNCF TGVs – The French Lignes à Grande Vitesse (LGVs) high speed network has expanded greatly since the first route was opened in 1981. As a result there have been multiple variants of the associated Trains à Grande Vitesse (TGVs) constructed over the years. These have included both single and double deck (Duplex) versions, with all current in service trainsets capable of 300 km/h or higher. Most of the trainsets are single voltage units, TSI compliant 25 kV 50 Hz ac, though some multiple voltage variants have been constructed for use on cross border services. As much of the LGV network pre-dates the development of ETCS, much of the fleet is fitted with the older TVM430 signalling system which would need upgrading before any deployment on Rail Baltica. The age profile of the current fleets ranges from 34 years old to 11 years old. Moreover historically SNCF have used there TGV trainsets for the entirety of the expected useful life and to date, while some older trainsets have been reallocated to 'low cost' services, and a few are being transferred to an SNCF operated service in Spain, no equipment has been redeployed outside the SNCF family. When it is also considered that the TGVs are in many respects over specified for Rail Baltica services (in terms of speed capability and capacity), and there is no defined prospect of any surplus trainsets with effective remaining life becoming available, it is considered that there is not a realistic prospect of TGVs being a solution to the needs of Rail Baltica.
- DB ICE 1s – High speed train operation was first introduced in Germany in 1991, while this was 10 years behind France, there had been considerable delays, and the first rolling stock deployed on the service, now known as the Intercity Express (ICE) 1 was initially specified in the mid-1980s with an initial operating speed of 280 km/h (subsequently raised to 280 km/h). Recognising that the German high-speed lines are closely integrated with the conventional network, and the development of the high speed lines the ICE 1s are deployed on pre-dates the development of TSIs, these trainsets are equipped for the German national overhead power supply of 15kV 16 2/3 Hz and were not originally equipped with ETCS, while this has now been retrofitted to the fleet. The trains sets are also configured in long formations (360m), though it is likely that, with some engineering at adjusted to management systems, they could be reformed into shorter lengths if required. The fleet was fully refurbished in 2008 with the intention of running the asset for a further 10-15 years. DB announced a further life extension for the fleet in 2019 with the intention of retaining the fleet in service until the oldest trainsets are around 40 years old. This work also involves shortening the units to 280m and is due for completion in 2023. With the exception of the voltage, which would require conversion, the basic technical parameters of the ICE 1 fleet would work well for the Rail Baltica project (though it is expected that even in their shortened configuration, they could have more capacity than would be desirable). However, a 40 year operational life for a high sped trainset is at the extreme end of what has been achieved, and it is likely that by the time that DB were looking to dispose of the equipment that any further life extension would be economically unjustifiable. For this reason, it is considered that the use of ICE1 trainsets will not be a realistic prospect for deployment on Rail Baltica.

- Regional EMUs – The market for regional EMUs in the 160 – 200 km/h sector is considerably more liquid with lessors holding pools of equipment and very large volumes in use across Europe. There is a realistic possibility that some regional services could be operated with redeployed rolling stock cascaded from other routes and operators.
- Passenger Coaches – In theory, loco hauled passenger coaches should be the most readily deployable equipment on the Rail Baltica route. However, due a decline in their use in recent decades in favour of multiple units, the available pool of this type of equipment is very small and in high demand for speculative open access operations. This problem is even greater when looking at the pool of available coaching stock for night services after most were discontinued in the late 2010s. What remains is generally older stock which is normally being "sweated" to the end of its useful life.
- Locomotives – The availability of TSI compliant mainline locos for use on both freight operations and loco hauled passenger services is generally very good. A significant pool is held by leasing companies as well

as large numbers owned by public and private operators. It can be expected that locos could be deployed on the Rail Baltica route with comparatively short lead times. The situation with shunting locomotives is even more liquid. Shunting equipment that does not leave marshalling yards is not required to be mainline compliant, and there is very good availability of diesel, battery and electric shunters from leasing companies. There is also good availability of 'mixed' equipment, e.g. shunters that are mainline compliant which are used in yards and on lighter duty or 'last mile' operations. It should be noted, however, that the increasing availability of mainline locos with last mile (diesel or battery) functionality is reducing the need for shunters deployed by many operators.

- Freight wagons – Freight wagons are generally either directly owned by freight operators (particularly where specialist or bespoke designs are used) or rented from one of the several large wagon leasing enterprises that hold significantly large and diverse portfolios of wagons. The wagon leasing business work extensively with freight operators and customers to develop products that optimise operating characteristics and efficiencies. There can be high confidence that wagons for freight operations on the Rail Baltica route can be made available with comparatively short lead times.
- Infrastructure Maintenance Plant – The maintenance of railways requires regular use of specialist rail mounted, self-propelled equipment. Such equipment can be held directly by infrastructure mangers, by third party infrastructure maintenance contractors and by specialist rental providers. The lead times for new build equipment can be quite considerable and the second hand market tends to be restricted to near life expired assets, However, there is generally good availability of this plant within the latter two sectors, and given that Rail Baltica anticipate a need for a relatively small number of items of such equipment, which is likely to be used sporadically, there can be confidence that , for the initial years of operation at least, equipment will be available when required.

4.5.3. New Build Products

For mainline operational rolling stock, industry norms suggest that while shorter delivery times can be achieved for follow on orders and 'standard' locomotives, it is reasonable to allow at least three years between the commencement of a manufacturing contract and having a moderate sized fleet of equipment based on a standard product platform in service.

With no existing contract in place to provide the rolling stock, a lead time for developing, launching and undertaking a rolling stock procurement can be expected to take anything from around 6 months (if full undertaken within the private sector) to several years. For planning purposes, and assuming that the public sector needs to be party to any procurement, it is suggested that a two-year time scale is allowed for from initiating a procurement project to 'notice to proceed' to a manufacturer.

Assuming that the public sector will at least initiate the procurement of rolling stock and that operations will be delivered under some form of concession, then it must be assumed that the procurement will need to be undertaken under EU law, though at this stage it is not clear whether it will be utility or public regulations.

The use of EU regulations could permit Rail Baltica (subject to legal advice) to launch a procurement on behalf of a future private operator or rolling stock owner.

4.6. Programme Considerations

4.6.1. Regional Passenger Rolling Stock

It is currently anticipated that initial phases of the electrified standard gauge Rail Baltica route will open for regional passenger services in 2026, with the full route open from international cross border services expected to be available in 2030. As discussed above, from notice to proceed, an alliance of at least three years is required for a manufacturer to supply a moderate fleet based on an in production established product platform. This means, that if a new build fleet is required for the initial regional services then to allow for a period of trail operations prior to route opening, an order will need to be placed during the first half of 2023. Depending on the selected procurement route for such equipment, the process to place an order may need to be initiated as a matter of some urgency.

In the context of the limited availability of existing equipment that could be deployed on the Rail Baltica route and the absence of any available pool of currently not in use such equipment, planning and implementing a cascade of a fleet from an existing deployment will require considerable time. The initial identification of a suitable fleet which meets the functional and technical requirements, and which can be released from an

existing deployment by the end of 2025 at the latest (to allow for any refurbishment and re-homologation) will require considerable stakeholder engagement. There is no single source of information or established market for such transactions, and indeed if a fleet were to be available, then it can be expected that the replacement on its current services will already being procured.

4.6.2. High speed/Cross Border Rolling Stock

The time scales for procuring new build or cascaded in existing high speed international rolling stock will be broadly similar to that for regional fleets. An allowance of two years to plan and undertake a procurement with approx. three years for the fleet to be manufactured and made available for service is appropriate. This implies that for a 2030 route completion date, work on procuring such fleets would need to be commenced by 2025 at the latest, though a longer allowance would reduce risks to meeting delivery deadlines.

If, though it seems very unlikely, an existing fleet is an option for the international traffic, then the eight year window currently available would give adequate allowance to identify and secure a fleet, though it may be necessary to hold such a fleet in storage if the release from the current deployment is some time before the line completion date.

4.6.3. Freight Rolling Stock

It has been noted that there are significant pools of freight equipment in the commercial market that should be available for deployment on Rail Baltica. That said, the market will need sufficient time scales to identify, make available and homologate the existing equipment for use on the route. There is very little evidence on what time scale is required, however it is suggested at least three years before the route becomes available the market will want confidence on the technical parameters that will need to be satisfied by any rolling stock, and the process to be followed to demonstrate compliance. This will allow sufficient time for an owner and putative operator to develop and implement any required modifications and gain any required approvals.

Similarly, if any operators select to procure new rolling stock, then as with passenger equipment, a time scale of around three years should be adequate lead time for the delivery of new equipment from placement of an order. However, unlike public procurement time scales, private enterprises can typically initiate and place orders in much shorter time scales. This would suggest that as with existing equipment, the technical parameters of the new route need to be published during 2023 to allow services to commence in 2026.

4.7. Finance Availability and Risk Appetite

Financing for new trains could come from a range of sources which can be summarised as follows,

- Government/public sector grants/cash.
- Government/public sector loans/bonds.
- Private sector loans/bonds.
- International Funding Institutions (EBRD) and EIB debt.

The feature of these sources of funding are discussed below.

4.7.1. Public Purse

The simplest form of financing is the use of government (national or regional/local) tax revenues for up front capital payments or the new assets. This is the cheapest form of finance as no interest charges are payable, but in a cash constrained environment where competition for scarce government resources can be high, the affordability of such an approach is normally poor. The use of government cash also places any assets clearly on the public sector balance sheet along with the asset management responsibilities.

4.7.2. Public/Sovereign Debt

National and regional/local governments can typically borrow money at more attractive rates than private enterprises. If affordability limits the availability of up front capital payments, then the use of sovereign debt offers the next cheapest access to funding. However, as with the use of cash, the use of government debt allocates asset management responsibility and balance sheet treatment to the public.

4.7.3. Publicly Backed Bonds

As an option the public sector could chose to raise a specific bond for the purpose of financing the acquisition of new rolling stock. While has similar characteristics in terms of asset management responsibility and balance sheet to the use of more general government debt, it is possible that the targeted nature of a bond on assets that are seen as highly secure and fungible (redeploy able) could allow the market to price long term bonds at very competitive rates.

4.7.4. Private Debt or Bonds

In privately financed, off balance solutions, it can be expected that a third party owner would access commercial markets for debt. The owner will choose the mix of general debt or bonds and will be able to access funding from banks and institutional investors such as pension funds. As with the use of public bonds, the highly secure and fungible nature of most rolling stock assets should allow the market to price long term bonds at competitive rates.

4.7.5. Super National (IFI and EIB) Debt

Both public and private entities should be able to seek funding from international funding institutions (IFIs), which in the case of Rail Baltica would primarily be the European bank of Reconstruction and Development Bank (EBRD) or the European investment Bank (EIB). Use of funding from these sources has been seen successfully used across central and eastern Europe. The main advantage of this form of funding is that while they end at commercial rates, their participation in a transaction can ‘crowd in’ other market participants who will take confidence from their presence in the deal.

Whatever capital structure is selected, it is considered likely that it will be possible to gain ‘green’ accreditation for any debt or bonds, which in turn will make it attractive to EBRD and EIB as well as a wide range of private sector lenders (banks and institutional lenders). EBRD or EIB participation in any financing would also help ‘crowd in’ private sector participants.

Rolling stock has proved to be an attractive asset for infrastructure investors both in terms of equity and debt. This is particularly true in cases where the investors have a high degree of confidence that the asset has a low ‘residual value’ risk, that is there is a high degree of confidence that rolling stock will remain in service for the duration of its expected economic life.

Recognising the 30-40 year life of rolling stock (which can be even longer for freight equipment), this means that procurers need to think carefully about the level of risk to allocate to third parties to achieve the optimum balance of cost of finance and future flexibility. For instance, metro type fleets which are closely integrated to the infrastructure and on which changes to the service provision are unlikely, are often considered to be highly ‘sticky’ and hence can be financed at very competitive levels even without the use of usage guarantees, while small fleets used for longer distance speculative or open access services will attract a higher risk premium and may require usage guarantees to achieve a bankable arrangement.

4.8. Possible Procurement Parties and Their Capacity to Accept/Manage Risk

This subsection outlines the elements of procurement scope that could be included in the procurement, considers which parties could provide them and the risk allocation and other issues associated with the selection of any particular providing party.

In order to define the scope of the project, it is necessary first, to consider the objectives the project is seeking to meet. Any rolling stock procurement project has the following primary objectives;

- Ensuring that compatible and sufficient rolling stock is available to operate the services which are envisaged to be introduced on Rail Baltica.
- Ensuring that a suitable facility is available from which to maintain the new stock and that appropriate commercial arrangements have been put in place for the ongoing maintenance of the trains.
- Within the affordably, policy and strategic constraints applicable, ensuing that the full transaction offers the best value for money to all stakeholders over the whole life of the newly acquired rolling stock and across the whole of the local rail industry

In order to meet these objectives, it is necessary to define more clearly the scope of asset availability and maintenance services along with the extent of risk transfer for availability and reliability which the client wishes

to procure under the project and what scope and risks it wishes to retain and/or transfer to other parties (i.e. operators or infrastructure managers).

The development of the definition of the scope of the procurement therefore needs to consider the elements which need to be procured or otherwise secured, which together will meet the objectives, and review the method by which they can be sourced. These elements are described below. In developing the procurement scope it has to recognised that the delivery party for some elements can vary over life of the train. In particular service delivery parties can transfer as the risk profile of the trains and their operation matures over time.

The elements to consider are as follows;

- Manufacture, supply and commissioning on behalf of the train owner of sufficient numbers of units to populate the required number of diagrams plus additional units to allow for planned and unplanned maintenance.
- Use of the trains on a daily basis by an operator through a lease or other commercial arrangement.
- A 'design authority' for the trains to ensure that modifications, updates and configurations are controlled and where necessary in accordance with the homologation rules throughout the life of the train.
- The supply of appropriate and legitimate consumable items and spare parts throughout the life of the trains.
- The provision throughout the life of the trains of 'light maintenance' services allowing for the regular inspection and repair of the trains both for planned and unplanned activities.
- The provision throughout the life of the trains of 'heavy maintenance' services allowing for periodic overhaul and refurbishment of the trains, both for planned and unplanned activities.
- The development, construction and commissioning on behalf of a depot owner, of one or more maintenance facilities from which light and/or heavy maintenance services can be delivered.
- Use of the maintenance facilities on a daily basis by a train maintainer through a lease or other commercial agreement.
- The provision throughout the life of the maintenance facilities of building and equipment maintenance.
- The provision throughout the life of the trains of train maintenance planning services and operational control of the maintenance facilities.

With the exception of the manufacturing of the trains and the development of maintenance facilities, all the other elements relate the operational life of the trains and can have arrangements of varying length and hence different levels of risk transfer.

Within the elements of scope, the following generic risks have been identified as requiring to be considered ad appropriately allocated, again recognising that the allocation of some risk can vary over the life of the train.

- Train design, development and approvals risk.
- Train delivery and acceptance risk.
- Train availability risk.
- Train reliability risk.
- Train asset condition risk.
- Train residual Value risk.
- Depot development and construction risk.
- Depot availability risk.
- Depot asset condition risk.
- Depot residual value risk.
- Maintenance scheduling risk.

Further consideration of risks is discussed below.

4.8.1. Technical Design and Approval

Historically, large state owned and private railway companies undertook the detail design and specification of rolling stock and had it constructed under their supervision by either their own or third party enterprises. In this model the railway company held all the technical risks associated with achieving the required functionalities and

approvals. In recent decades there has been a strong trend towards a model where clients specify output based requirements with rolling stock manufacturers holding the detail design and approval risks

4.8.2. Commercial/Cost

As with the technical risks, the trend in recent years has seen clients transfer cost risks to the supply market. While in the traditional 'client design' model, it was possible to secure a fixed price for a defined scope, any modifications required to achieve the required outputs or functionalities were at the clients cost and risk. In the more modern approach, it has proved possible to transfer the full cost risk to the market and achieve fixed prices from manufacturers for a fully compliant and approved rolling stock fleets. In this approach the scope for cost changes during the delivery pages of the project are limited to changes in requirements set by the client. Typically, this restricts variation costs to between 5 % and 10%

4.8.3. Programme

Across the world, rolling stock projects have a poor track record of delivering on time. The reasons for this can be wide ranging, but amongst the most common areas are gaining approvals and homologations and developing reliable software. Clearly, the ultimate holder of the programme risk is the client who is looking for the rolling stock to be in service by a certain date. However, in the risk transfer model discussed for technical and cost risk, the supplier will be bound to achieving delivery by pre agreed dates, failure to achieve this will trigger financial compensation (and sometimes a requirement to offer a fall-back solution), thus protecting the client from the consequences of programme delays.

4.8.4. Maintenance/Reliability/Availability

As part of any rolling stock acquisition a detailed maintenance plan is developed for the fleet and a target/expected level of reliability and availability is defined. There is still variation in the industry as to the party allocated responsibility for delivering these maintenance plans with many operators retaining this role in house, but an increasing use of outsourcing the work either to the original rolling stock manufacturer or a third party maintainer. While retaining the work in house allows full control, the use of outsourced maintenance allows an effective transfer of risk which when coupled with effective performance regimes has been shown to deliver high levels of reliability and availability. There is also a significant use of partial outsource models, typically with a manufacturer providing spares and overhauls for a fixed fee, thus taking a degree of reliability and parts consumption risk.

4.8.5. Residual Value

Passenger rolling stock has a planned useful life of around 35 years, and freight equipment can typically operate for 40 or more years. In situations where the use of rolling stock on a deployment for its whole operational life is not guaranteed (as would be case in many concession or open access based service models), a party is required to manage the risk of securing an ongoing use of the assets beyond any particular application. In the large state enterprise, on balance sheet ownership approach of past years, it would be up to the state enterprise to manage this across, which they would comfortably do across extensive portfolios of routes and fleets. In a situation such as Rail Baltica, where third patty owners will almost certainly be involved, and the network is very limited, these risks will be harder to manage.

4.8.6. Procurement Parties

While there are many variants on how some of the potential parties could be constituted, in considering the scope of the procurement and the party to which risks can be allocated, the following generic parties have been identified.

- Rail Baltica (RB Rail AS).
- A Railway Undertaking (a train operating company).
- A train manufacturer.
- A train maintainer.
- A train owner.
- A parts supplier.
- A depot developer.

- A depot owner.
- A depot facility manager.
- A consortium or joint venture formed by some or all of the above.

Appendices B and C provide an analysis of the ability of each of these generic parties to provide the various elements of scope and accept the associated risks. It can be seen that the joint venture/consortium approach offers the most comprehensive coverage of the scope elements and highest level of risk transfer away from the public sector. The downside to this type of structure is that the duration of any agreement would have to be long enough to make the investment and return worthwhile, typically this could be upwards of 20 years, thus reducing the flexibility to adopt other arrangements and/or deployments of the trains as time progresses.

4.9. Option Generation

Typical ownership arrangements for rolling stock can be split into four broad models as follows;

- Directly owned by the public sector (national or regional government).
- A publicly owned specialist enterprise (which could be a railway undertaking or separate rolling stock owner).
- A privately owned rolling stock owning enterprise (not a railway undertaking).
- A privately owned railway undertaking (this not an option in the gift of Rail Baltica as a private operator could chose its own solution it is required to provide rolling stock).

Within these models there are a range of sub options with regards to how the finance and ownership is structured, the mechanism by which the rolling stock is made available to the operator for daily use and the arrangements for long term maintenance of the assets.

In situations where the rolling stock is not directly owned by the operators, a range of sub options for making rolling stock available typically include:

- A dry lease – a lease where maintenance risk is held by the lessee, though typically a reserve is built up for long cycle lifecycle maintenance.
- A wet or soggy lease – a lease where some or all maintenance risk is held by the owner.
- An availability payment – the operate pays a fee for each train made available on a daily basis with maintenance risk held by the owner.
- Use under licence – the owner permit use of the assets under certain conditions, which may or may not include maintenance risk, but no payment is involved.

Lease arrangements are the most commonly used models as they offer the opportunity to optimise effective risk transfer while still permitting off balance sheet treatment.

Availability payment based models have been implemented (most notably the UK IEP fleets), however while these can be off balance sheet, the degree of risk transfer involved can lead to costly ‘gold plating’ of the assets and maintenance regimes and high risk premiums.

The use under licence model can still be off balance sheet if the owner is a private sector entity which holds the asset management risks even if the finance payments associated with equipment are funded by the public sector, so long as the duration of any term for such an arrangement passes sufficient residual value risk to the owner.

Given the desire for off balance sheet solutions, of particular interest is the current context is the use of privately owned structures, in particular privately owned rolling stock owning enterprises. Moreover, in the context of the discussion points noted above, a leasing based approach would appear to be a reasonable starting assumption.

Private sector owners tend to be agnostic as to whether or not they directly hold the maintenance risk. While holding the risk and offering rolling stock under wet or soggy leases offers the opportunity for increased revenue and potentially higher margins, there is considerable additional management and overhead required, and many operators are not keen paying the additional costs associated with the approach.

Private sector owners will, however, want confidence that the assets are being correctly maintained and that the whole life costs associated with the maintenance are secure. For this in addition to provisions in the lease agreements relating to maintenance performance and associated audit, the owners often seek to put in place

long term maintenance or maintenance support agreements lease agreements with the original rolling stock manufacturer (or a third-party maintainer). The lease would require the operators to take the services under the long-term agreement which would be portable between leases.

4.9.1. Assessment Criteria

At this stage of the development of a rolling stock procurement it is not possible to undertake a full quantified assessment, however it is possible to consider the how the available options will perform against a range of assessment criteria. These criteria are discussed below.

4.9.1.1. Strategic Fit

As discussed above, the Rail Baltica scheme and the Baltic nations have a range of strategic goals and objectives for the scheme. They also have capacity, capability, policy and affordability constraints within which the considerations of options will need to sit. The extent to which any particular option addresses these requirements and constraints will determine its strategic fit.

4.9.1.2. Financial and Economic Value

Due to the differing funding options (and associated cost of such funds) and available risk allocation models, the value for money of each approach can be quite different. In time it is suggested that a fully risk adjusted quantified evaluation of the most preferred options is undertaken in order to optimise the value for money. However, it this stage a high qualitative assessment is appropriate to identify the approaches which are most likely to taken forward.

4.9.1.3. Deliverability

The deliverability of an option takes into account the programme issues associated with any option as well as the market appetite and capacity to offer the desired solution, the client side capacity to transact and manage the project and the degree of project and outcome risk associated with the option. At a later stage each of these aspects will require separate assessment, however, at this stage an overall composite consideration of the issues is considered appropriate.

4.10. Option Assessment

Based on the foregoing discussions it is possible to undertake a high-level performance assessment of the options described above. This is shown below.

Table 4-2 – Option Assessment of Rolling Stock Ownership

	Strategic Fit	Value for Money	Deliverability
Direct ownership	Poor - does not meet Baltic states' aspirations in terms of affordability or capacity to own	Moderate - While there are no direct funding costs, the risk adjusted cost once all asset management responsibilities are included dilutes value	Moderate - While the process is simple to make happen, and the market can respond, the client is not well equipped to undertake the process
A dry lease	Good - meets the main constraints and aspirations of the Baltic states	Moderate to good - funding costs are offset by transfer of asset management risks, VfM is improved if outsourced maintenance is used	Moderate to good - depending on nature if any usage guarantees, should be deliverable in the market and will not be too hard for the client to undertake
A wet or soggy lease	Good - meets the main constraints and aspirations of the Baltic states	Moderate to good - funding costs are offset by transfer of asset management risks, VfM is improved as outsourced maintenance is used	Moderate to good - depending on nature if any usage guarantees, should be deliverable in the market and will not be too hard for the client to undertake
An availability payment	Moderate - while this meets many aspirations and constraints, the long contract term inherent in such a deal is a major negative	Moderate - unless the deal is carefully calibrated, the level of risk transfer could be too high to be good value	Moderate - low risk transfer versions are readily understood by the market, but an off balance sheet risk transfer will be hard to attract market interest.
Use under a licence	Not applicable - this approach works within the above options		

4.11. Discussion and Suggested Way Forward

Based on the foregoing it is clear that the combination of policy and strategic considerations, affordability constraints, programme issues, and current uncertainty on the commercial arrangements for service delivery means that there is no clear single option and that many of the possible rolling stock procurement and ownership options are not viable for Rail Baltica. It is however possible to generate a set of proposed arrangements that will be deliverable in the market and accommodate the issues noted above.

4.11.1. Passenger Rail Option

It is clear that it will be necessary to have rolling stock fleets in place in time to initiating services on the Rail Baltica route. As noted above, it is possible that existing equipment may be available for some of the services, however at this stage no market surveys have been undertaken, and any availability for multiple units and passenger coaches will, at best be opportunistic. Recognising, that the use of redeployed, cascaded in equipment cannot be relied on, to address this, it is necessary to commence planning for the procurement of the stock in the near future and to have in place an ownership arrangement for them. Furthermore, recognising the capacity, capability and affordability constraints of the Baltic nations it is considered that a third party ownership model in which the whole life asset management risk is managed by an entity is the most likely solution. If balance sheet treatment of the rolling stock is also a consideration, it is suggested that the ownership should be in the private sector.

Taking these issues together, the proposed solution is for Rail Baltica to initiate a dual-faceted procurement for regional rolling stock and a financier/owner to be combined into a single packaged arrangement. In this model it is possible to initiate separate procurements and bring preferred parties together at a later date, or to seek a single combined offer from manufacturers and financiers working together. It is proposed that the manufacturer would be required to design, build and deliver rolling stock to a defined output specification, with fleet sizes and latest acceptance dates defined in a deployment plan set by Rail Baltica. As shown in the indicative programme, in this approach, given the desire to initiate regional services in 2026, it is likely that Rail Baltica will be required to be the initial signatory to the manufacturing contract, with a view to novating the purchaser role to the financier once appointed. This arrangement has been successfully used previously.

Following novation, the rolling stock would be accepted and paid for by the financier/owner who would be offered a concession of approx. 20 years during which they would be obliged to offer to any operators using the Rail Baltica route rolling stock at a defined and agreed lease rate. Of course, this option is not without ongoing obligations on the part of Rail Baltica, in order to ensure that the financier/owner is confident in their investment it will be necessary to provide a revenue guarantee in which Rail Baltica undertake to ensure that any operators on the route use the financier/owner's fleet or offer to pay all (or possibly a significant proportion) of any shortfall in revenues resulting from rolling stock being off lease.

Clearly the extent to which the minimum revenue guarantee is called upon will be linked to the operating model selected for the delivery of passenger services. Any choice to offer only fully open access to the infrastructure would result in a greater risk to Rail Baltica, while a fully concession based model would have much lower financial risk.

The commercial arrangements of this approach are summarised in the figure below and the preliminary programme for regional and high speed/cross border trains is shown in Figure 4-2.

Figure 4-1 - Passenger Rolling Stock Commercial Wire Diagram

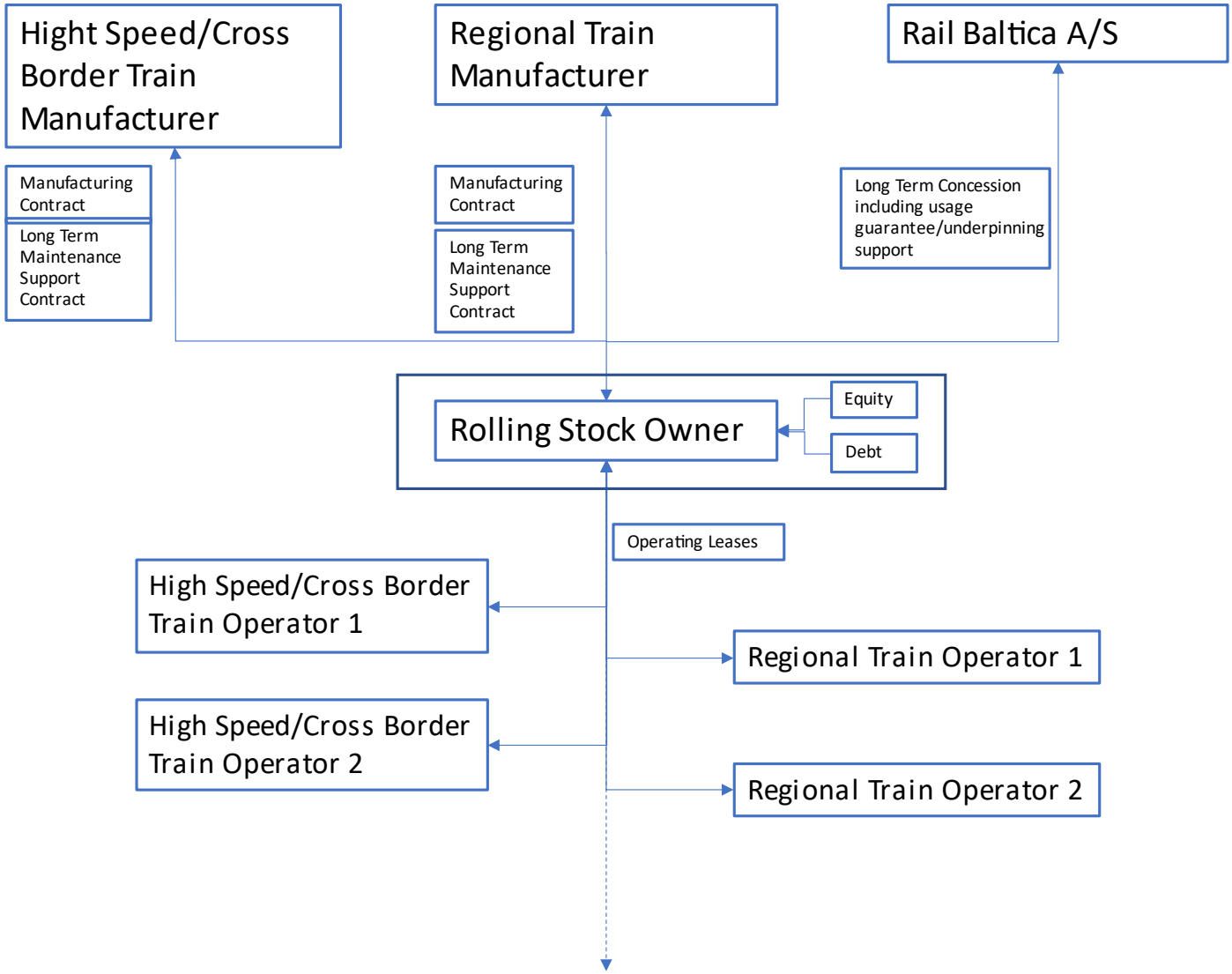
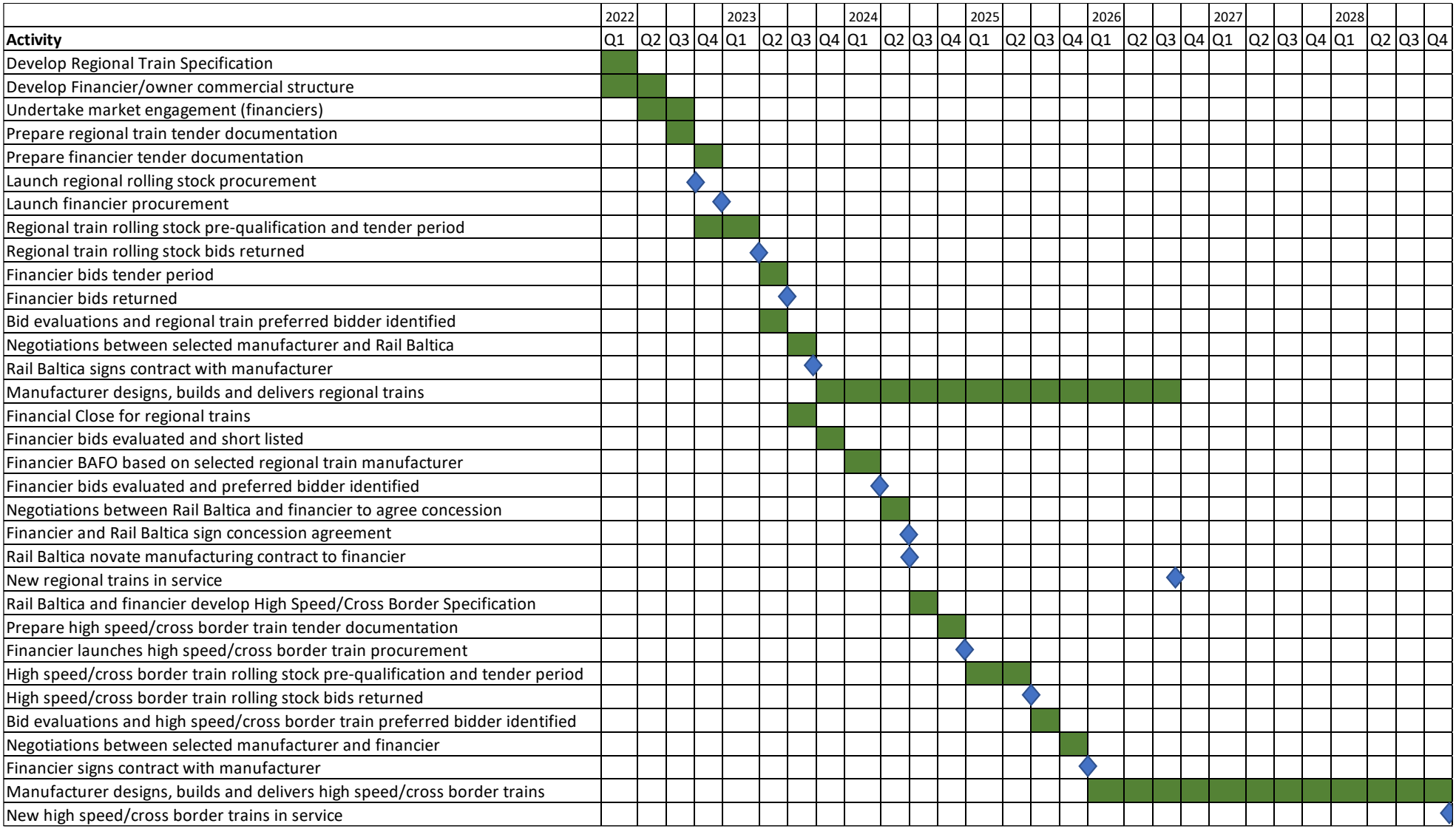


Figure 4-2 – Train Manufacturing and Financier Procurement Indicative Programme

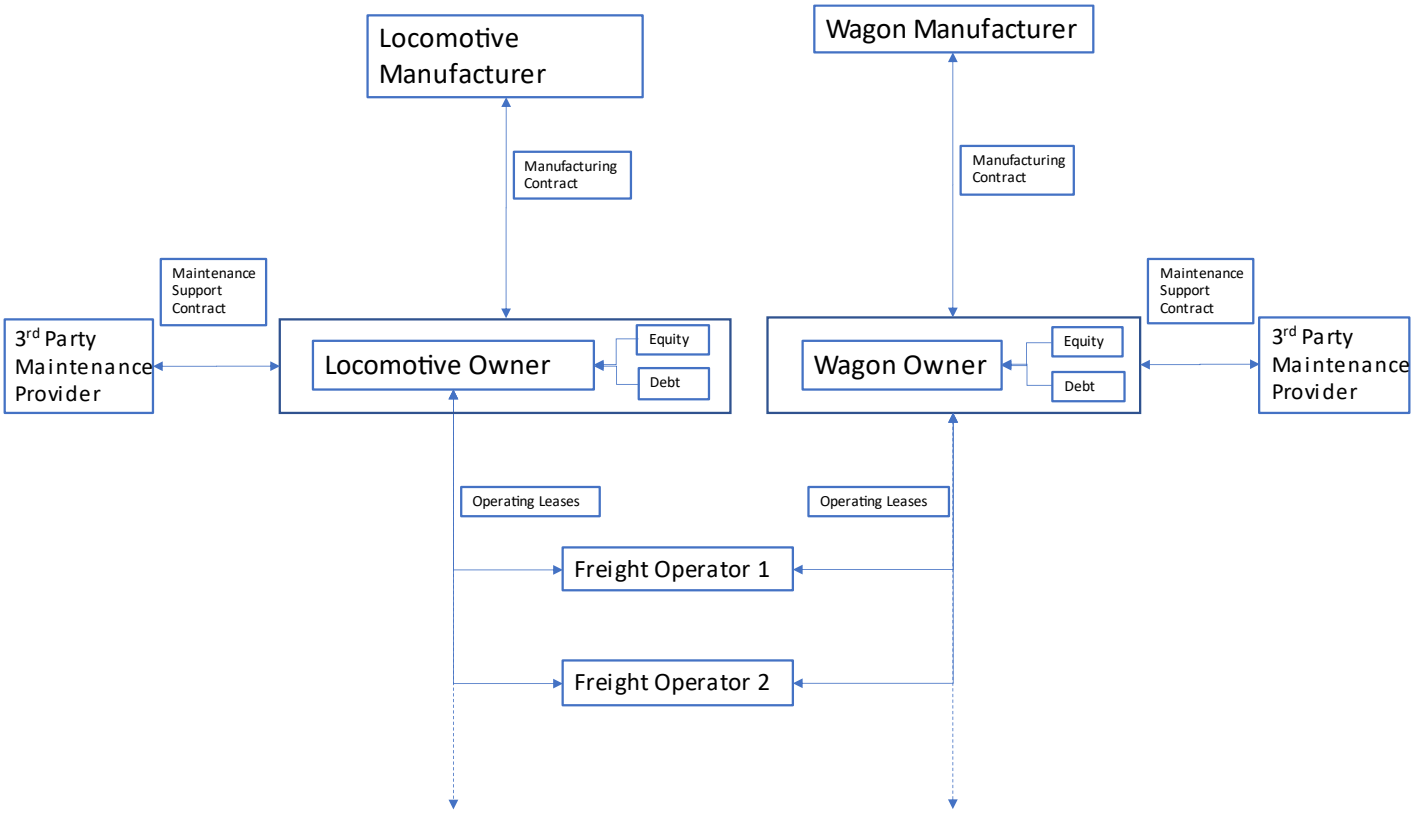


4.11.2. Freight Equipment

As discussed above, Europe has extensive pools of started gauge, TSI compliant freight locomotives and wagons (notwithstanding the possible need to upgrade to FRMCS) which are held by freight operators and leasing companies. It is expected that the while in due course freight use of the Rail Baltica route will expand to require 100-200 locomotives, in the initial years of operation, as demand ramps up it is safe to assume that the required equipment will be found with in the 'float' in the currently available pools. As the required volumes of equipment increases it can further be assumed that the market will respond and procure the necessary locomotives and wagons. Moreover, it is expected that freight will be run on the Rail Baltica route on a fully open access basis, with any public support being targeted in such a way that is agnostic to the operator and not tied to any particular equipment. Freight use of the route will occur as and when customers require it, there is no expectation that the public sector will lay on services which do not have pre-defined users. A further consideration is that freight equipment will be neither technically nor operationally captive to the Rail Baltica route, or indeed any other part of the European standard gauge network. It therefore seems difficult to see how a specific, dedicated fleet for Rail Baltica freight is either necessary or desirable. The only possible exception to this would be if specialist dual gauge equipment was being planned, however, as discussed above, this is not currently considered as a realistic proposition in the foreseeable future.

For the reasons outlined above, it is suggested that no specific arrangements are put in place for freight equipment, and that the market is allowed to provide freight equipment as and when it is required. As noted, in many cases this will mean freight operators using some, or all, of their own equipment, and in others it will mean leasing equipment from the range of commercial enterprises offering both locomotives and wagons. While this option may feel less proactive than some might prefer, it is likely to match rolling stock provision to market need. For a leasing based arrangement the commercial arrangements are illustrated in the figure below.

Figure 4-3 - Freight rolling stock leasing commercial arrangements



Given the suggested solution is entirely commercial, and to a great extent relies on the market responding to demand, there is no procurement action required. However, in order to allow the market to prepare itself to offer freight services, it is essential that whoever leads the process publish a detailed access prospectus to the market a minimum of three years ahead of the anticipated opening of sections of the route to traffic. This will need to detail the technical characteristics of the route as well as the charging regime, and the processes operators will need to go through to apply for access and, if necessary, demonstrate route compatibility of their selected equipment.

4.11.3. Infrastructure Maintenance Equipment Plant

It is noted above that there is generally good availability in the market of specialist self-propelled on track infrastructure maintenance plant within the third-party contractor and rental markets and single option for securing the equipment is clearly superior to any other. The key decisions for the future operator will be business model issues, whether they wish own maintenance plant directly and whether they wish to undertake maintenance in house or whether to outsource it.

Direct ownership of equipment would require capital of around €20m, which is relatively modest compared to the operational rolling stock required, however, this may still sit outside any aspirations to either finance or manage. Moreover, the size of the investment would also be too small to be of interest to the private investment market as an off-balance sheet special purpose company. That said, in both the in-house and outsourced maintenance model the option exists to either procure equipment which could be used by either directly employed maintainers or made available to third parties. However, given the small number of items of plant required, and the likely intermittent nature of the requirement, it can be expected, that, in the initial years of operation at least, then rented in equipment will be the most appropriate solution. If an outsourced maintenance option is selected, then the contractors will have the option to either rent in or procure their equipment. This will in turn be driven by the duration or any maintenance agreement.

4.12. Rolling Stock Maintenance Facilities

The RB project has assumed the construction of facilities for rolling stock maintenance, the procurement of the construction of these is assumed to be independent of the rolling stock and to be funded as part of the RB scheme. That said, it can be expected that if the suggested model for passenger rolling stock procurement and ownership is followed, then it will be possible to offer a long term lease to the preferred maintainer of the assets. Indeed, the procurement schedule shown above is followed, then it should be possible to permit the selected maintainer (almost certainly the manufacturer) to construct and fit out the facilities and to recover the costs of such works in the maintenance service fees to the passenger operators. Furthermore, there may be a need, downstream, to consider investments in depot customisation to optimise maintenance for the selected fleet(s). Depending on the lease arrangements with any rolling stock owner, it can be expected that such investments will be the responsibility of the owner and/or the maintainer. As with the original investment, this investment would be recovered within the maintenance service fee or lease payment for the rolling stock.

4.13. Rolling Stock Key Findings

In this section it has been shown that there a broad range of institutional, financial, programme and market issues that will need to be considered in determining the preferred way forward for the various types of rolling stock anticipated to be required. While a possible way forward has been identified, this has not been fully optimised. Moreover, the RB project needs consider the following key issues that will impact the definition of the selected solutions

- For regional and passenger services, it cannot be assumed that existing rolling stock fleets will be available, there is no meaningful pool of appropriate equipment that can be deployed on the RB route.
- While opportunistic use of existing assets may be possible for marginal services it is almost certain that new build equipment will be required for the main services.
- The timescales for acquiring rolling stock mean that it is essential that plans are initiated for the procurement or transfer of assets early in 2022 if services are going to commence in 2026.
- It is likely that a private sector finance solution for passenger rolling stock will offer the best balance of strategic fit, value for money and deliverability. The use of such solutions has several international precedents.
- The use of private finance is dependent on avoiding the use of novel or high risk features, in particular, gauge switching is considered undeliverable.
- In the event that private sector finance is used to purchase and own the passenger rolling stock flee, however, given the uncertain nature of the services to be operated, it will be essential for some form of medium to long term usage guarantee to be provided

- With sufficient notice of the technical parameters and approvals regime, it is highly likely that the provision of freight rolling stock can be left to the market (freight operators and/or leasing enterprises) to address
- The provision of on track maintenance plant will be determined by the business model decision on the delivery of maintenance services. In the short term, the market should be able to provide this equipment from existing asset pools, but intime a dedicated fleet may be required.

5. Recommendations & Conclusions

5.1. WP1

1. Coordination of TAC rates over the three Baltic nations is required whether or not there is a single IM – otherwise prices will level up to the most aggressive view of the capacity of RUs to pay.

2. Coordination over capacity allocation and prioritization process is also required to ensure both consistency across borders and between types of traffic to prioritized.

3. Whilst Direct Costs are usually calculated from historic data in the case of RB it will be necessary to develop a detailed cost model to include the inspection, maintenance, renewals and operation of assets of the IM and use proxy rates and assumptions as required. This model will need to be a multi-year model as it will need to take account of the fact that the RB railway will be newly built so should require lower levels of renewals and maintenance in the first few years and also take account of the fact that freight and passenger services will not all start on year 1.

4. The cost model is required to determine the most appropriate TAC rates – to ensure that:
   - It is greater than Direct Costs at a flow level,
   - It generates revenue levels for the IM no greater than the Total Allowable costs at a network level
   - The impact of different TAC rates on the freight forecast (numbers of trains) and freight revenue (including to the IM) are understood. This is additionally required to understand the environmental impact,
   - The impact of different TAC rates on the commercial viability of PSC/PSO passenger services (and requirements for PSC service subsidies) are understood,
   - The impact of different TAC rates on the commercial viability of “open access” passenger services are understood.

5. Having TAC rates that cover at least the Direct Cost is an obligation from the European legislation, but charging Mark Ups above than this for any traffic is complex. Having TAC rates higher than the Direct Cost risks (other than passenger PSC/PSO traffic) may cause rail traffic in that sector not to run. Clear market analysis done in advance will help test the ability to pay of different segments – but the greater the Mark Up proposed the greater the risk that such a Mark Up will be unsustainable and be open to legal challenge. A low level of Mark Up will increase open access competition in the rail freight and high-speed rail services. It may be worth considering therefore testing the charging all freight traffic and all “open access” passenger traffic at Direct Cost only and charging different PSC/PSO traffic TAC rates up to the cap of Total Admissible costs.

6. If PSC/PSO services pay higher TAC rates than “open access” passenger services consideration should be made of granting them priority capacity allocation.

7. Resolving TAC (and other regulatory and commercial matters) is an urgent priority as otherwise the private sector will not invest in operations or equipment leaving the whole cost to the national government. Freight RUs will not order new wagons until they know what they will be charged to use them.

8. For freight, given:

- The difficulties in establishing what freight RUs might be able to afford to pay by way of a Mark Up,
- The greater difficulty of coordinating freight TAC prices with a Mark Up than coordinating TAC prices across nations at a level closer to the Direct Costs (because agreeing a market price requires agreement and coordination on both the Direct Cost and the level of Mark Up and the Mark Up requires some professional judgment),
- The risk of freight being priced off Rail Baltica particularly as there are viable non-rail alternatives currently and rail will have to win market share,
- The complexity of any grant regime and
- The policy support of DG Move and the national governments for rail freight and the central role of rail freight in the Rail Baltica business case and CBA,

It is recommended that the TAC for freight is set a level close to the Direct Cost or at least the financial impact of such a low freight TAC is modelled.

5.2. WP2

9. In order to determine the likely subsidy required/profit made for each service group a detailed Comparator Model is required. This model should be for the whole rail system, not just of the Railway Undertaking. Factors such as Track Access Charges and Rolling Stock costs have an important part in the decision-making. This model should be used to understand the likely levels of overall subsidy of the railway and assist with how this is allocated between the Infrastructure Manager and Railway Undertakings. This will also be crucial in determining the passenger service contracting method that is likely to be suitable for each of the service groups.

10. There is likely to be the largest risk around the farebox revenue side of the Comparator Model. We understand that a passenger demand forecast is being produced but it is recommended that any central forecast is subject to extensive scenario and sensitivity testing. This will enable any results from the Comparator Model to be stress-tested so that the full implications and risks are apparent.

11. Should further work be required to test the minimum level of service required in each service group to realise the benefits of the scheme, as this may be an important consideration in pursuing any open-access arrangements, the Comparator Model should be used extensively in this task, as it will determine the likely overall subsidy required.

12. Note that where services are left to “open access” operators unlikely to offer the level of (PSO) services consistent with the RB business case as “open access” passenger operators will only seek to maximise revenue, not patronage.

13. Even if open access operation is considered to be an option from the Comparator Model testing, it is extremely unlikely that all services will be able to be operated on an open-access basis. This therefore means that a PSO will need to be established and a competition for a PSC, established. Consideration should therefore be given now to the form, and jurisdiction, of the Competent Authority established to run these competitions. This Competent Authority will inevitably need to exist across the three nations, with input from the three nations, given the cross-border nature of many of the services. The relationship of the Competent Authority to the Infrastructure Manager will also need to be determined.

14. Consideration should be given to the early operation of skeleton services as soon as practical (i.e. before construction of whole line) to provide data, stimulate market & enable services to start gradually. This becomes a means by which the effectiveness of any “shadow operation” can be tested e.g., in the recruitment of driver and establishment of operating systems. This might be combined with the existing “Shadow Operations” tender.

15. After an initial period of operation there will be more cost and revenue/demand data that will give operators greater confidence - though PSO contracts can be offered without “revenue risk”. It is worth noting that even with a PSC/PSO contract managing “revenue risk” is complicated and there are perverse incentives that can cause over-bidding and commercial defaults.

16. Consideration should be given to undertaking an early Market Engagement exercise with potential operators. This exercise can be used to test some of the early considerations being examined in this piece of work, such as the method of procuring and financing Rolling Stock, appetite for open-access operations and so on. It can also be used as an important signifier to the international market that this railway is opening in the next years and is serious about competition for passenger services.

17. Even with a strong emphasis on “open access” operations it may still be necessary to lease/purchase rolling stock for passenger services because the “open access” operators are unlikely to order such rolling stock whilst the costs, regulatory framework and the market are so uncertain.

18. Resolving the regulatory and commercial framework for RB is an urgent priority as it adds to the risk of operating services and purchasing equipment which may cause such risks to default back to the national governments by default,

19. No PSC/PSO for freight is recommended.

5.3. WP3

20. While opportunistic use of existing trains may be possible for local services it is most likely that new build equipment will be required for the international high-speed services.

21. The long timescales required for acquiring rolling stock, and bringing it into service on a new line, mean that it is essential that plans are initiated for the procurement or transfer of assets early in 2022 if services are going to commence in 2026/7 – even if a skeleton form.

22. Financial close will require other areas of commercial uncertainty to be resolved before rolling stock can be ordered – not after.

23. It is likely that a private sector finance solution for passenger rolling stock will offer the best balance of strategic fit, value for money and deliverability. This is not uncommon.

24. If private sector finance is used to purchase the passenger rolling stock, given the uncertain nature of the services, some form of medium to long term guarantee will need to be provided.

25. With sufficient notice of the technical parameters and approvals regime, the provision of freight rolling stock can be left to the market (freight operators and/or leasing enterprises) to address.

26. The provision of on track maintenance fleet and plant will be determined by the business model decision on the delivery of maintenance services.

Appendices

6. Appendix A

A.1. European Regulation

This part of the appendix provides information relating to section 2.2 European Legislation, which includes additional information relating to:

- Direct Cost.
- Mark Ups.
- TAC.
- Network Grants.

A.1.1. Direct Costs

This section provides further detail to main report within section 2.5.2 on Direct Cost, relating to:

- The legislation of Direct Costs.
- The calculation of Direct Costs at Network level.

A.1.1.1. Legislation detail

This section follows on from section 2.5.2 and provides detail on the Legislation of Direct Costs.

Direct Costs are the costs directly incurred as a result of operating the train service. Critically, Direct Costs are the minimum that Railway Undertakings can be charged by a Railway IM for TAC.

Setting the TAC at a minimum, i.e., at the costs directly incurred by the train service, is designed to ensure that the IM does not suffer a net financial loss as a result of operation of the train service, and thereby avoids the risk of one type/source of traffic cross-subsiding another. This matters, because, otherwise, the impact on different Railway Undertakings and their customers (whether freight or passenger) would be partial, and in the case of RB would cause there to be the risk of a cross-Network Grant not only between different flows of traffic/passenger services but also between the different countries of the Baltic states: Estonia, Latvia and Lithuania. However, if TAC levels are set on RB at a level close to the minimum of Direct Costs there is a risk that some traffic may be attracted to RB that would otherwise remain on the 1520 mm network – though this risk is low because of the way that the RB line has been designed to capture North-South traffic particularly to/from the EU and the 1520 network was designed to mainly cater for East-West traffic to/from Russia and Belarus.

The Regulations state that the IM should include in the calculation of its Direct Costs only those costs that it can objectively and robustly demonstrate that they are triggered directly by the operation of the train service. The Regulation does not specify the methodology that should be used but provides guidance on the elements that should and should not be included (see below). In fact, it specifically allows for technically different forms of econometric or engineering modelling that might offer a higher degree of precision in calculating Direct Costs of the use of infrastructure.

National regulatory bodies should be able to check whether the different charging principles are applied consistently and impartially with the information the IM provided to them, as well as being able to check if such rules comply with the Legislation to prove impartiality.

The IM may include in the calculation of its Direct Costs on a networkwide basis the following costs:

- The part costs of the infrastructure, including switches and crossings, that is exposed to wear and tear by the train service.
- The part of the costs of renewing and maintaining electrification equipment, such as overhead wires or electrified third rail (electrification equipment, which is ground based), and the supporting overhead line equipment directly incurred as a result of operating the train service.
- The costs of staff needed for keeping open a particular stretch of line if an applicant requests to run a specific train service scheduled outside the regular opening hours of this line.
- The costs of staff needed for preparing the allocation of train paths and the timetable to the extent that they are directly incurred as a result of operating the train service.

This calculation of Direct Costs can become quite technically detailed. For example, if a Railway Undertaking uses a particular type of equipment or a method of operation that has an impact on the Direct Costs of the IM this can be included. Rolling stock is also a factor that impacts on the Direct Cost, for example:

- New rolling may cause less wear and tear than others.
- Older or poorly maintained rolling stock can lead to increased wear and tear.
- Heavy rolling stock can also lead to increased wear and tear.
- Other issues to consider are examined later in this paper.

The Regulatory Body based on the European Regulation 2015/909 establishes that in the component A (Direct Cost) must be determined considering the wear and tear criteria so considering the weight, speed and electricity or others.

Member States may allow the IM to modulate the average direct unit costs to take into account the different levels of wear and tear caused to the infrastructure according to one or more of the following parameters:

4. train length and/or number of vehicles in the train.
5. train mass.
6. type of vehicle, in particular its unsprung mass.
7. train speed.
8. traction power of the motorised unit.
9. axle weight and/or axle numbers.
10. recorded number of wheel flats or the effective use of equipment to protect against wheel slips.
11. longitudinal stiffness of vehicles and horizontal forces impacting on the track.
12. consumed and measured electric power or the dynamics of pantographs or contact shoes as a parameter to charge for the wear and tear of the overhead wire or the electric rail.
13. track parameters, in particular radii.
14. any other cost related parameters where the IM can demonstrate to the regulatory body that values for each such parameter, including variation to each such parameter where relevant, are objectively measured and recorded.

A.1.1.2. Calculation of Direct Costs at Network level

This section follows on from section 2.5.2 and provides detail on the calculation of Direct Costs at Network level:

EU Directive 2015/909 sets out how this can be applied on a network wide basis, "*Direct Costs on a network-wide basis are calculated as the difference between, on the one hand, the costs for providing the services of the Minimum Access Package and for the access to the infrastructure connecting Service Facilities and, on the other hand, the non-eligible costs*." The formula to calculate the Direct Cost at a network level is:

- Cost (MAP) + Cost (for the access to the infrastructure connecting service facilities) – Non Eligible Costs = Direct Cost.

The MAP is a Defined Term and relates to the services that need to be provided to a Railway Undertaking by the IM in order for them to operate their services.

The charges to access the railway infrastructure should be specified in the document called Network Statement. Article 27 of the Directive 2012/34/EU describes the obligation for each rail IM to publish a Network Statement. Network Statements include all the information that applicants need to know in order to place requests for infrastructure capacity access, in particular the commercial, technical and legal access conditions. The Network Statements aim to provide applicants wishing to operate services on a given rail network with a single source of up-to-date, relevant information in a transparent and non-discriminatory way.

The items that should be included in the MAP are:

- Handling of requests for infrastructure capacity.
- Right to utilise capacity which is Network Granted.
- Use of running track points and junctions.
- Train control including signalling regulation, dispatching and the communication and provision of information.
- Use of electrical supply equipment for traction current, where available.

- All other information required to implement or operate the service for which capacity has been Network Granted.

However, the MAP does not cover all services that may be required by a Railway Undertaking. In particular, the MAP excludes the use of Service Facilities.

The European Commission states in the Directive 34/2012: *"Service Facility means the installation, including ground area, building and equipment, which has been specially arranged, as a whole or in part, to allow the supply of one or more services referred to in points 2 to 4 of Annex II".*

To ensure transparency and non-discriminatory access to rail infrastructure, and to services in service facilities, for all Railway Undertakings, all the information required to use access rights should be published in a network statement. The network statement should be published in at least two official languages of the Union in line with existing international practices.

The services referred to in point 2 to 4 of the Annex II of the EU Directive 34/2012 are the following:

Point 2, basic services:

Passenger stations, their buildings and other facilities, including travel information display and suitable location for ticketing services.

Freight terminals.

Marshalling yards and train formation facilities, including shunting facilities.

Storage sidings.

Maintenance facilities, with the exception of heavy maintenance facilities dedicated to High-Speed trains or to other types of rolling stock requiring specific facilities.

Other technical facilities, including cleaning and washing facilities.

Maritime and inland port facilities which are linked to rail activities.

Relief facilities.

Refuelling facilities and supply of fuel in these facilities, charges for which shall be shown on the invoices separately

Point 3, Additional services may comprise:

Traction current, charges for which shall be shown on the invoices separately from charges for using the electrical supply equipment, without prejudice to the application of Directive 2009/72/EC.

Pre-heating of passenger trains.

tailor-made contracts for: — control of transport of dangerous goods, — assistance in running abnormal trains.

Point 4, Ancillary services may comprise:

Access to telecommunication networks.

Provision of supplementary information.

Technical inspection of rolling stock.

Ticketing services in passenger stations.

Heavy maintenance services supplied in maintenance facilities dedicated to High-Speed trains or to other types of rolling stock requiring specific facilities.

The charges to obtain access to those facilities and the services offered are not considered in the MAP, they are in fact defined separately.

According to Article 7, where the IM, in its legal form, organisation or decision-making functions, is not independent of any Railway Undertaking, the functions of Infrastructure and services charges and Allocation of infrastructure capacity shall be performed respectively by a charging body and by an allocation body that are independent in their legal form, organisation and decision-making from any Railway Undertaking.

The charge imposed for track access within Service Facility (SF) referred to in point 2 of Annex II, and the supply of services in such facilities, shall not exceed the cost of providing it, plus a reasonable profit.

Where services listed in points 3 and 4 of Annex II, as additional and ancillary services are offered by only one supplier, the charge imposed for such a service shall not exceed the cost of providing it, plus a reasonable profit. The Directive leaves the door open for different interpretations regarding how charges are to be

implemented in practice by the Service Facility Operator (SFO) when several related services are provided at the same facility.

In all cases the SFOs should publish the information on charges for getting access to SF and charges for the use of each rail-related service supplied therein. However, whilst this is often the case Atkins has found examples across Europe where SFOs have not complied – partly because of the administrative complexity (for example in France in some rolling stock maintenance depots).

The regulatory body should ensure that charges set by the IM are non-discriminatory. Negotiations between applicants and an IM concerning the level of infrastructure charges shall only be permitted if these are carried out under the supervision of the regulatory body.

For example, the charge for GSM-R is divided in two parts, the first for access of the use of the system and a part strictly linked to the use of the network.

The SF are not included in the TAC of the MAP.

“Non-eligible costs” is also a Defined Term. Non-eligible costs cannot be considered as a Direct Cost

. The Regulation defines a list of non-eligible costs, as follows:

1. Fixed Costs relating to the provision of a stretch of line which the IM must bear even in the absence of the particular train movements of the Railway Undertaking being charged TAC.
2. Costs that do not relate to payments made by the IM. Costs or cost centres that are not directly linked to the provision of the MAP or to access to infrastructure connecting service facilities.
3. Costs of acquisition, selling, dismantling, decontamination, recultivation or renting of land or other fixed assets.
4. Network-wide overhead costs, including overhead salaries and pensions.
5. Financing costs.
6. Costs related to technological progress or obsolescence.
7. Costs of intangible assets.
8. Costs of track-side sensors, track-side communication equipment and signalling equipment if not directly incurred by operation of the train service.
9. Costs of information, non-track side located communication equipment or telecommunication equipment.
10. Costs related to individual incidences of force majeure, accidents, and service disruptions without prejudice to Article 35 of Directive 2012/34/EU.
11. Costs of electric supply equipment for traction current if not directly incurred by operation of the train service. Direct Costs of operation of the train services that do not use electric supply equipment shall not include costs of using the electric supply equipment.
12. Costs related to the provision of information mentioned under item 1(f) of Annex II to Directive 2012/34/EU, unless incurred by operation of the train service.
13. Administrative costs incurred by schemes of differentiated charges referred to in Articles 31(5) and 32(4) of Directive 2012/34/EU.
14. Depreciation which is not determined on the basis of real wear and tear of infrastructure due to the train service operation but rather a financial proxy for such wear and tear designed to allow the cost impact to be regular and forecastable financially.
15. The part of the costs of maintenance and renewal of civil infrastructure that is not directly incurred by operation of the train service.

It is important to note that the Direct Costs of all services operated on a given network, because of the non-eligible costs, are less than the total costs that will be incurred by the IM of that rail network. This means that if the TAC for all services was only at the level of the Direct Cost for those services, the IM would suffer a financial shortfall that would need to be balanced by other financial support.

In order to minimise IMs being subsidised where the traffic has some capacity to pay more than the Direct Costs, “Mark Ups” are allowed. The section below defines when and how “Marks Ups” can be applied.

A.1.2. Mark Ups

This section provides further detail to main report within section 2.5.2 on Mark Ups, relating to:

- The Legislation of Mark Ups.
- Example of how Market Segmentation operates for Mark Ups.

A.1.2.1. Legislative detail

This section follows on from section 2.5.3 and provides detail on the Legislation relating to Mark Ups.

Mark Up is a Defined Term, and defined as follows:

- Article 32(1) of the Directive 2012/34/EU states that: “In order to obtain full recovery of the costs incurred by the IM a Member State may, if the market can bear this, levy Mark Ups on the basis of efficient, transparent and non-discriminatory principles, while guaranteeing optimal competitiveness of rail market segments. The charging system shall respect the productivity increases achieved by Railway Undertakings.”

Based on this definition, the Legislation does not exclude the payments by Railway Undertakings for TAC higher than Direct Costs where appropriate. However, the Legislation does not permit a uniform “Mark Up” but requires the IM to price TAC differently according to the market competitiveness of the different market segments. The Legislation makes it clear that the responsibility for understanding the relative competitiveness of the different market sectors sits with the IM, as follows:

- “Before approving the levy of such Mark Ups, Member States shall ensure that the IMs evaluate their relevance for specific market segments, considering at least the pairs listed in point 1 of Annex VI and retaining the relevant ones. The list of market segments defined by IMs shall contain at least the three following segments: freight services, passenger services within the framework of a public service contract and other passenger services. IMs may further distinguish market segments according to commodity or passengers transported.”

Further detail on potential market segmentation is provided in Annex VI-1 to Directive 2012/34/EU; in particular, it determines (at a minimum) which types of traffic (market segments) can have different TAC, where it is stated that:

- “The pairs to be considered by IMs when they define a list of market segments with a view to introducing Mark Ups in the charging system according to Article 32(1) include at least the following:

1. Passenger versus freight services.
2. Trains carrying dangerous goods versus other freight trains.
3. Domestic versus international services.
4. Combined transport (refers to the carriage of goods from one place to another using different means of transport) for versus direct trains.
5. Urban or regional versus interurban passenger services.
6. Block trains versus single wagon load trains.
7. Regular versus occasional train services.”

It is important to note that Mark Ups for traffic (whether passenger or freight) are based on the capacity market segments to bear the extra costs – and not on a particular flow of traffic. Nothing in the Legislation permits the IM to negotiate Mark Ups depending on traffic flow levels. In other words, an IM cannot seek to charge more (or less) for the Mark Up component of a new or existing traffic that is not consistent with other traffic in the same market sector, even where a Railway Undertaking may be able to pay. For example, if a Railway Undertaking has identified and secured rights to haul a very profitable new flow of freight traffic, the IM cannot seek a higher TAC because of the high profitability of the new flow, despite the Railway Undertaking having greater capacity to pay; instead, the TAC must be based on existing (and regulatory approved) methodology. This is important, because otherwise there would be no incentive for Railway Undertakings to secure new (more profitable) traffic given that all such extra profit would have to be negotiated with the IM. This would also make very complicated for the Railway Undertakings to charge the end users the optimum amount and they would not know what they will be charged.

A.1.2.2. Example of how Market Segmentation operates for Mark Ups

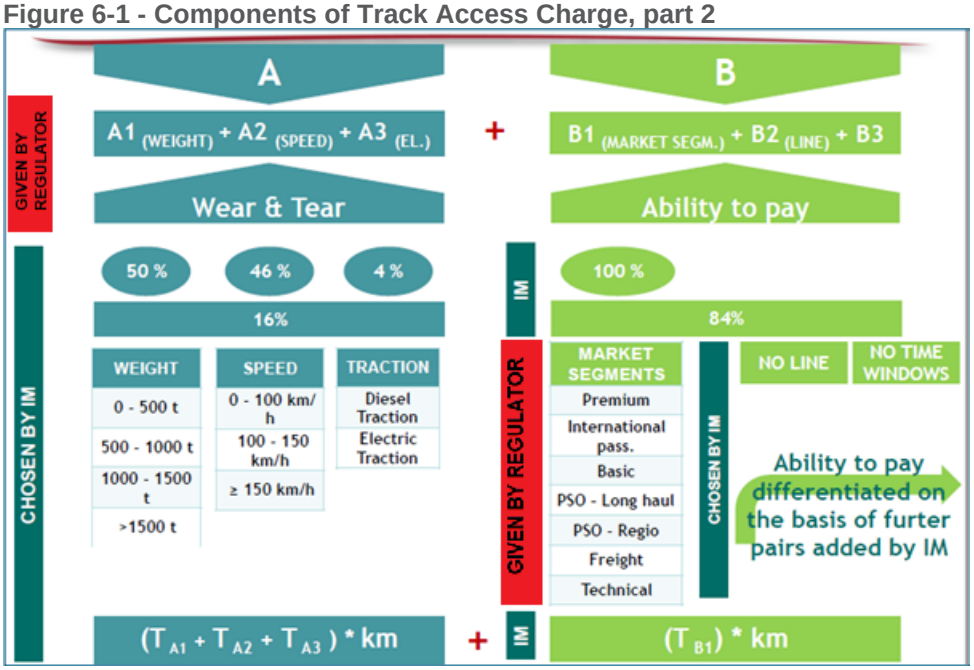
This section follows on from section 2.5.3.2 and provides detail on the Legislation relating to Mark Ups.

In the figure, there is the example for the TAC in Italy where the Direct Cost component (A) given by the regulatory body are weight, speed and traction, while the Mark Up component (B) given by the regulatory body are the market segments.

The total weight for the three components of the Direct Cost are 16% of the efficient total cost, while the Mark Up component covers 84% of the efficient total cost.

For the component A variables, the categories are given by the IM. For the weight, there are 4 categories, for the speed 3 categories and for the traction, 2 categories.

Figure 6-1 - Components of Track Access Charge, part 2



The charge for each train path is determined by the sum of the three A, and B components according to the following formula:

- $Ttrain = TA, train + TB, train$;

Whereby:

- $TA, train$ is the TAC for the component A;
- $TB, train$ is the TAC for the component B.

Policy targets can, therefore, be integrated within the formula with the Mark Ups definitions.

Through this mechanism market segmentation becomes an instrument which allows policy makers to encourage through Network Grants rail traffic with desired characteristics. This can be applied at a high level, for example a having a TAC regime that incentivises more freight services instead of passenger services with a lower Access Charge, or to advantage domestic freight traffic instead of international freight traffic or at a more sophisticated level, for example modulating the tariffs in the TAC to subsidise the use of rolling stock that meets defined noise level specification, or to encourage the use of more modern braking systems

These, policy driven, variables still need to be defined in advance, be transparent, be impartial and secure approval from regulatory agencies. These requirements are important to prevent politicians from investing policy objectives to meet short-term political requirements and from imposing policy objectives that might discriminate between Railway Undertakings.

It is important to note that typically such policy driven TAC variables create a “trade off”, favouring one market segment over another. For instance, supporting freight through a lower TAC, this will simply displace passenger traffic as this can result in a higher TAC for passenger services.

It is possible to underline that there is possibility to divide in Pairs[20] different typology of segment of traffic.

[20] The term “Pairs” is used in EU Directive 34/2012 to differentiate between two different market segments, such as passenger and freight services, with a view to introducing Mark Ups within the charging system.

Figure 6-2 - Typology of traffic

1	**Maritime services (ferries)**	↔	**Land services (rail, in the strict sense)**
2	**Commercial services** (freight-passengers)	↔	**Technical services** (shipping of material, testing, etc.)
3	**Passenger transport**	↔	**Freight transport**
4	**Open access passenger transport**	↔	**Passenger transport subject to PSOs**
5	**International open access passenger transport**	↔	**National open access passenger transport**

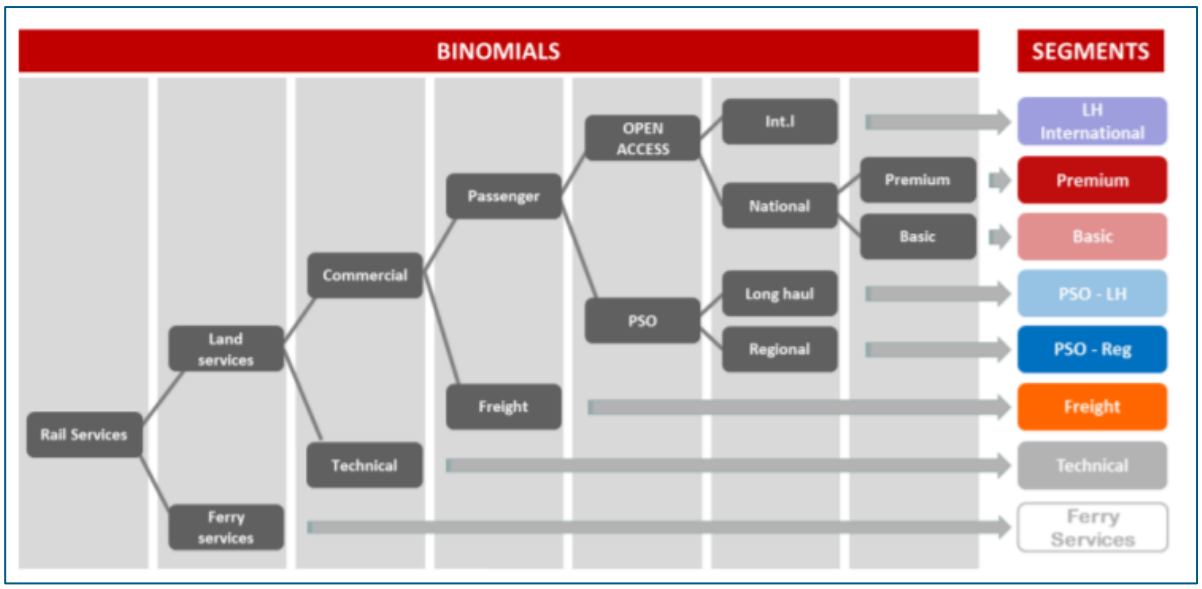
For the freight trains, it is possible to have more segmentation, but the decision is not only related to regulatory bodies, but also to political decisions.

The structure adopted, broken down into levels may be improved by the IM by adding additional pairs, explaining the reason for the choice based on adequate inquiries on the market segmentation of rail services, in accordance with the following rules:

1. Each pair belonging to a specific level shall derive from a single pair component placed at the higher level.
2. It is not possible for multiple pairs to derive simultaneously from the same pair component placed at the higher level.

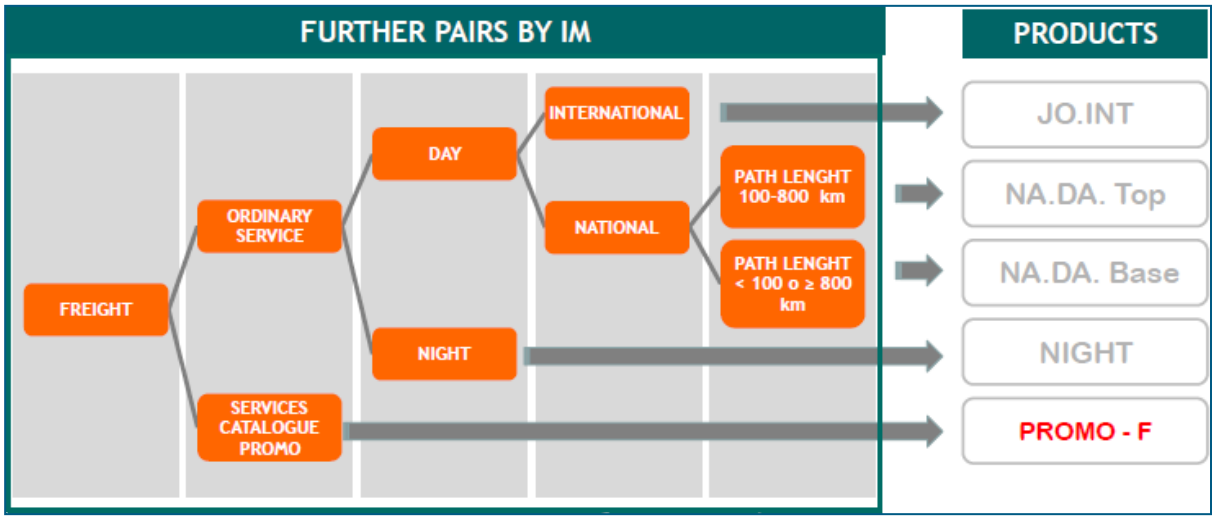
The pairs to be considered by IMs when they define a list of market segments with a view to introducing mark-ups in the charging system.

Figure 6-3 - Pairs by IM, part 1



For example, in Italy for rail freight the IM decided to establish further segments as showed in the figure below.

Figure 6-4 – Pairs by IM, part 2



The PROMO segment has been introduced in order to promote the development of new railway services and new connections, or to using considerably under-utilised lines as stated in Article 33 of the European Recast Directive 34/2012. There are different kinds of PROMO segments depending on the rail traffic (passenger, freight, regional services).

Promo F is a subsegment for the freight and it is used for the development of new railway services.

When analysing the structure of different countries TAC policies, it is possible to underline the A and B components. For example, in Italy it is possible to see the market segmentation and the level of every single component. Each market segment pays a different rate of TAC; this is in part because the ability to pay is different between services. e.g., between High-Speed services and other segments of the market (freight trains), and in part because the Direct Costs incurred by the IM (component A) are different for every kind of segment. A similar differentiation can be seen within the freight market segment, where different charges are for international freight and night freight services for the Mark Up component.

For example, in Italy it is possible to see the market segmentation and the level of every single component.

Each market segment pays a different rate of TAC.

In part this is because the ability to pay is different between services. e.g., between High-Speed services and other segments of the market (freight trains). However, this is addition to the changes in the Direct Cost component charged that result from the fact that the Direct Costs incurred by the IM (component A) are different for every kind of segment.

A similar differentiation can be seen within the freight market segment, where different charges are for international freight and night freight services for the Mark Up component.

A.1.3. TAC

This section provides further detail to main report within section 2.5.4 on the elements that make up the TAC:

- Total Admissible Cost (“TAdC”).
- Total efficient Cost (“Cnt”).
- Components of the TAC.
- Other Possible variables elements within the TAC regime.

A.1.3.1. Total Admissible Cost (“TAdC”):

This section provides further detail to section 2.5.4.2 of the report.

The Total Admissible Cost includes all costs relating to the operation of the network and defined financial mechanisms associated with investment in the network (depreciation and return on capital).

The return on capital is generated by applying a rate of return to the Net Invested Capital (NIC), according to the method based on the weighted average cost of capital (WACC). The level is decided by the regulatory body following analysis undertaken on the utilities sector more generally.

The TAdC of a rail IM, can be calculated from the (forecast) accounts of the IM. It can be done before the Direct Costs and other elements are attributed to individual flows of traffic. The TAdC is calculated according to the formula below:

- $\mathrm{TAdC} = \mathrm{Cnt} + (\mathrm{State\ funds} + \mathrm{other\ commercial\ revenues\ of\ IM})$
- $\mathrm{Cnt} = \mathrm{Direct\ Cost} + \mathrm{Mark\ Up}$
- $\mathrm{Cnt} = \mathrm{TAC}$

A.1.3.2. Total efficient Cost ("Cnt")

This section provides further detail to section 2.5.4.3 of the report.

The Total efficient Cost (Cnt) is the total cost for which the IM is permitted to seek TAC charges. It is similar to but less than the TAdC, as it excludes the Network Grant and some commercial income.

The Cnt is calculated from:

- Co relevant and efficient operating costs relating to MAP services.
- Ca depreciation of the net book value of the assets underlying MAP services, determined net of public contributions.
- Crc Return on Net Invested Capital (net of public contributions) related to MAP services.
- $Ecdp$ Government contributions as defined in Contractual agreements, referred to the relevant costs for the activities underlying MAP services.
- $Efpp$ non-refundable revenues from private and public sources, to the extent attributable to the activities underlying MAP services.
- Eec surpluses arising from other commercial activities, as defined below:
  - 100% of the gross margin (revenues less costs, including depreciation) of other business activities, qualified by the IM as ancillary, deriving from the use of the railway infrastructure or in any case associated with such infrastructure, pursuant to Article 13 of Legislative Decree No 112/2015. This might include rental from buildings or rights of way on railway land e.g., for fibre optic cables.
  - 50% of the net margin of other business activities (revenues less cost, net of depreciation), qualified by the IM as not connected to the railway infrastructure. This might include profits made from the sale of services such as payroll administration or engineering consultancy. This would also include online data bases, predictive analytics, IT services, etc.
- Rc is equal to revenues from MAP charges; SF are not included in the calculation of the CnT (and also the MAP).

Which gives:

- $\boldsymbol{Cnt} = Co + Ca + Crc - (Ecdp + Efpp + Eec) = Rc$

The Cnt is different to the TAdC, because the TAdC includes an allowance for the recovery of depreciation and the return on capital and (varying levels of) surpluses arising from commercial activities.

The Cnt formula can also be shown as:

- $\boldsymbol{Cnt}$ = TAdM $-(Ecdp + Efpp + Eec)$.

After the calculation of the Total Admissible Cost, it is possible to evaluate the contribution of the State, which will impact on the Mark Up, but only after the Direct Cost for all individual train services are known.

A.1.3.3. Components of the TAC

This section provides further detail to section 2.5.4 of the report.

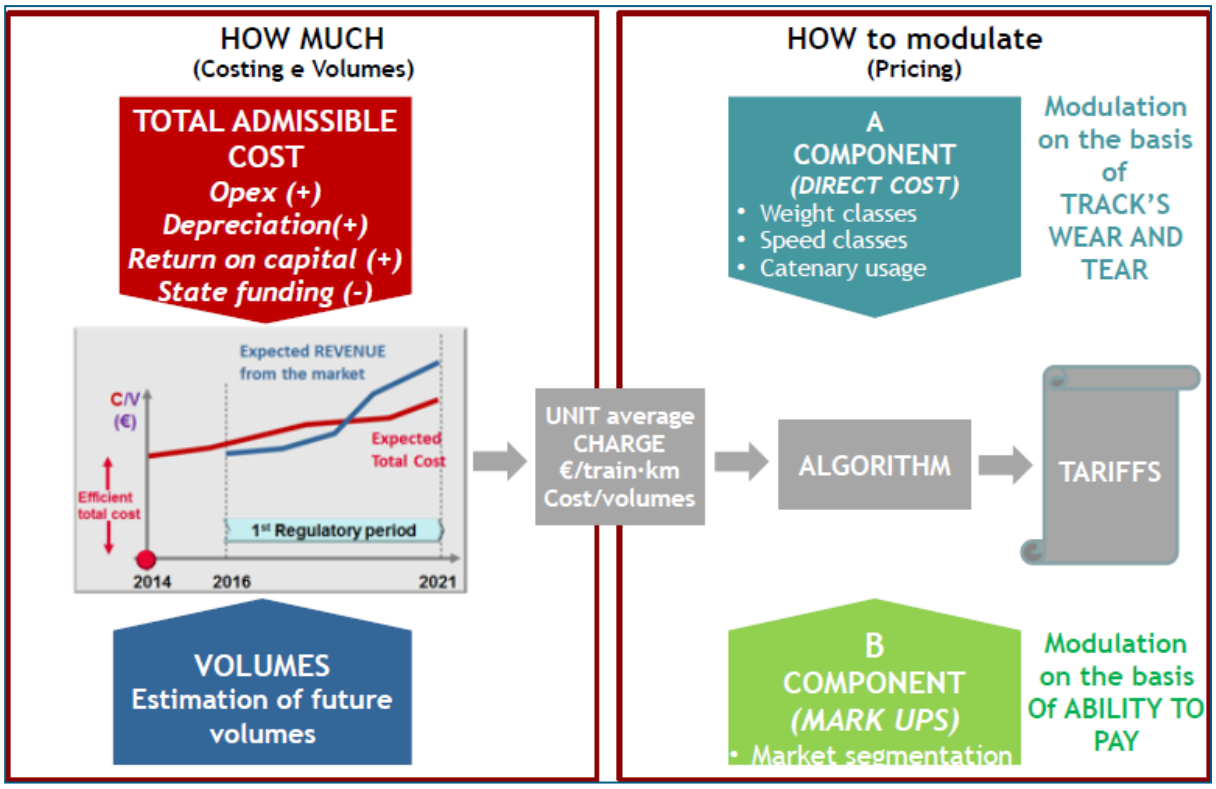
The TAC can be divided in two main components:

- Component A (Basic Charge) to obtain recovery of Direct Costs on a network-wide basis upon initial application.
- Component B (Charge based on the ability of Railway Undertakings to pay), to obtain recovery of the relevant and efficient total costs, valued on a network-wide basis and net of relevant Government contributions.

Component A is simple to understand. However, for component B it is worth making several important additional points. Component B:

- Shall be designed so that the related total revenues allow, when added to the component A, to obtain recovery of the Total Efficient Cost Cnt. As determined on the basis of the criteria set by the Authority, relating to the provision of services of MAP and access to the infrastructure connecting service facilities;
- Shall take as a reference - for the purpose of ensuring the consistent structure of the charging scheme - the general provisions of Article 32, paragraph 1 of Directive 2012/34/EU, adopting the "Mark Ups" approach outlined therein.

Figure 6-5 - Components of TAC, part 1



Other Possible variables elements within the TAC regime

In addition to basing the TAC Marks Ups based solely on the ability of Railway Undertakings to pay plus Direct Costs, it is possible to add some other variable components to be included within the methodological calculation.

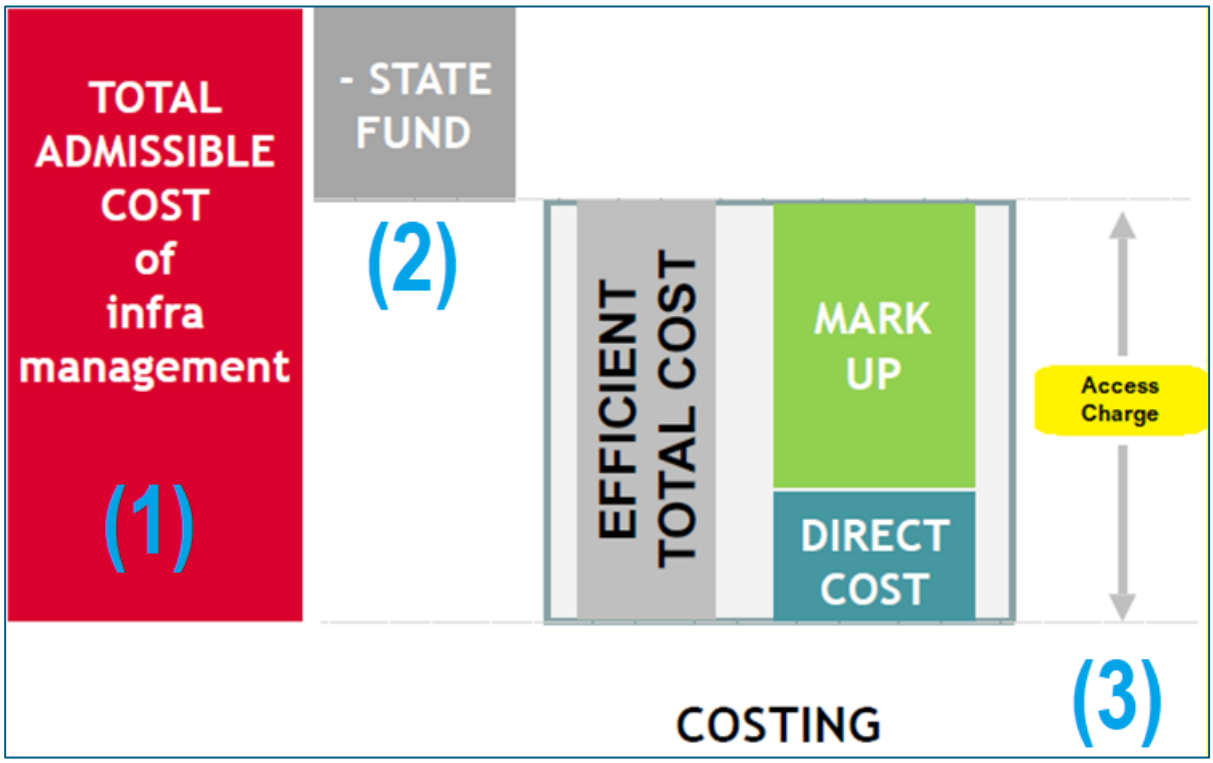
The same for the component B (Mark Up), the Regulatory Body asks the IM to apply further criteria which consider the ability to pay of the different market segments.

A.1.4. Access Charge and Government contributions (Network Grant)

This section provides further detail to main report within section 2.5.5 on the different models that can be adopted for providing Network Grants, and can be seen in the three following sections:

- Reduction of Total Admissible Cost by Network Grant (Area 1)
- State contribution (Network Grant) with contract program with IM (Area 2)
- Contribution (Network Grant) to the IMs to reduce the Access Charge for Railway Undertakings (Area 3)

Figure 6-6 – TAC Costing



Government's contributions linked to the IM and the train Access Charge are made in many different countries, with difference cases and examples.

A.1.4.1. Reduction of Total Admissible Cost by Network Grant (Area 1)

There are different ways in which it is possible for governments to reduce the Total Admissible Cost. A typical way in which this can and is done is by a government reducing the historic debt of the IM.

This reduction reduces the interests and amortisation cost in the balance sheet of the IM. This thereby requires the IM to lower their TAC.

In the case of Italian IM, Rete Ferroviaria Italiana (RFI) which is a subsidiary of Ferrovie dello Stato (FS), the state-owned holding company, the reduction of the debt of RFI related to the High-Speed network construction was implemented within the financial law 2007 (December 2006). The total cost of the High-Speed infrastructure in Italy was €33.2bn (Source: Ministry of Economy); with a significant part paid for by the State. The infrastructure cost of the High-Speed infrastructure was paid by the state in the Financial law for 2007. Thanks to that decision, RFI, the Italian IM, has a low level of the debt (c.€4bn on a net asset base (NAB) of €34bn). In turn this has meant that RFI has been able to reduce the cost of track access.

For international infrastructure, such as the LTF (Lyon Turin Ferroviarie), connecting Italy to France by a new tunnel, the cost of construction of the infrastructure is paid partially by the European union and that cost will be not included in the total admissible cost.

A.1.4.2. State contribution (Network Grant) with contract program with IM (Area 2)

EU Regulations (EU Directive 34/2012) also allow for the maintenance or future investment by the IM to be a part of a contract with the Governments and be accommodated within the TAC agreements. This is a direct Network Grant through a direct contract between government and the IM.

This contract can be annual or multi-annual and can consists of a contribution towards either the operational or investment costs (or both) of the IM.

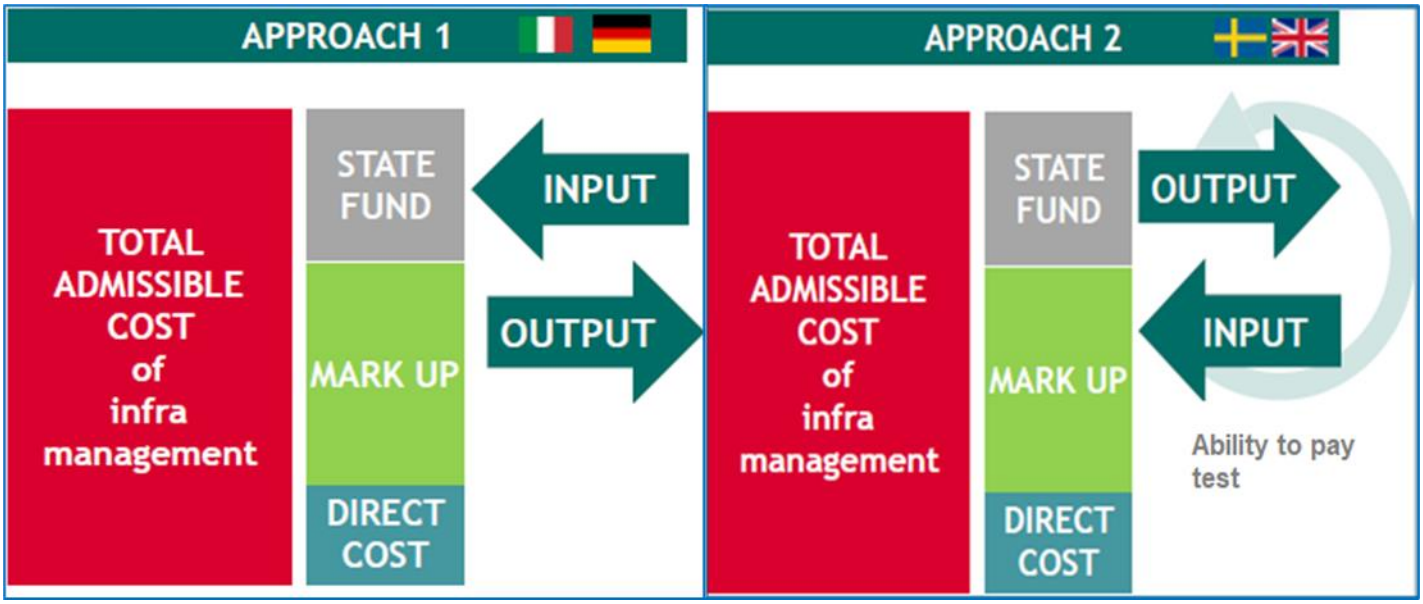
This contractual arrangement can be put in place in addition to reductions by government intervention in the TAdC of the IM achieved through other means.

As an example, in the case of Italy, the contract between the Italian IM (RFI) and the Italian Ministry of Infrastructure and Transport (MIT) is fixed around 1 billion of Euros (as per contract update 2020/2021, of the Contratto di programma 2017/2021).

There are two approaches to decide the level of the State funds in the example below:

- The first is where the State fund is the input, and the levels of the markup are the output. In this case there is a decision at the political level, to determine the level of the contribution. This approach has been adopted in Germany and in Italy.
- The second is where the markup is decided by an ability to pay test and this is the input of the calculation, while the level of state contribution in the output.

Figure 6-7 – Approaches for Italy & Germany, and Sweden & United Kingdom



A.1.4.3. Contribution (Network Grant) to the IMs to reduce the Access Charge for Railway Undertakings (Area 3)

The third way to fund to the IM is an indirect way. In fact, after determining the right level of the Direct Cost and Mark Up, it is possible to Network Grant the railways operators in the payment of the TAC.

The Access Charge level fixed by the calculation could be reduced ex-post.

In the case of Italy, the rail freight operators have a contribution of 100 million Euros annually to contribute to the payment of the TAC due to the lower level of service of railway infrastructure in the south of Italy (named “south discount” in the Legislation) and to the lower level of negative externalities as compared to the road transport.

The support is given by the Government via the IM.

Another example is coming from PSO market, where the governments Network Grants the rail passenger services and the Railway Undertaking pays for a high TAC,

This is the case in all the countries of Europe, where the Network Grants cover a part of the Access Charge de facto.

A.2. Benchmarking TAC

This part of the appendix provides information relating to section 2.6, which includes additional information relating to:

- Trends in the cost of TAC for freight per net tonne-km.
- Comparison in the TAC rate for freight per net tonne-km.
- Comparison of revenues by freight operators/in the EU.

A.2.1. Comparison of TAC across Europe

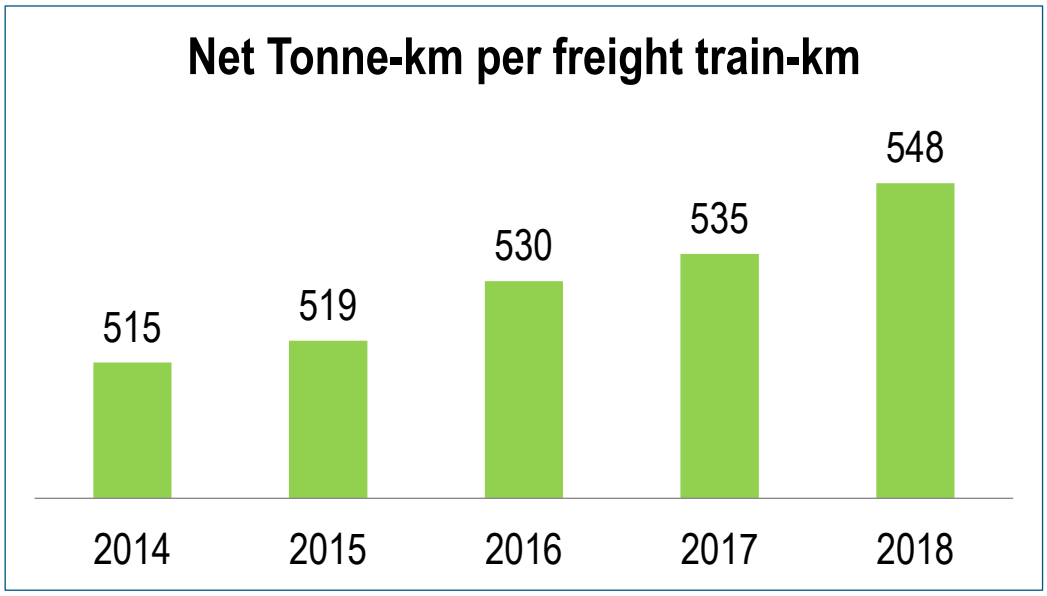
A.2.1.1. Trends in the cost of TAC for freight per net tonne-km

Because freight trains can vary in size it is important to consider how far this may be a relevant factor. The results below show the level of TAC, is the net tonne-KM per freight train-KM.

In Europe, the level of net tonne-KM has been growing for the last 5 years.

This may be an important factor in the consideration of the level of TAC in future for the RB line.

Figure 6-8 – Net tonnage per KM for freight trains



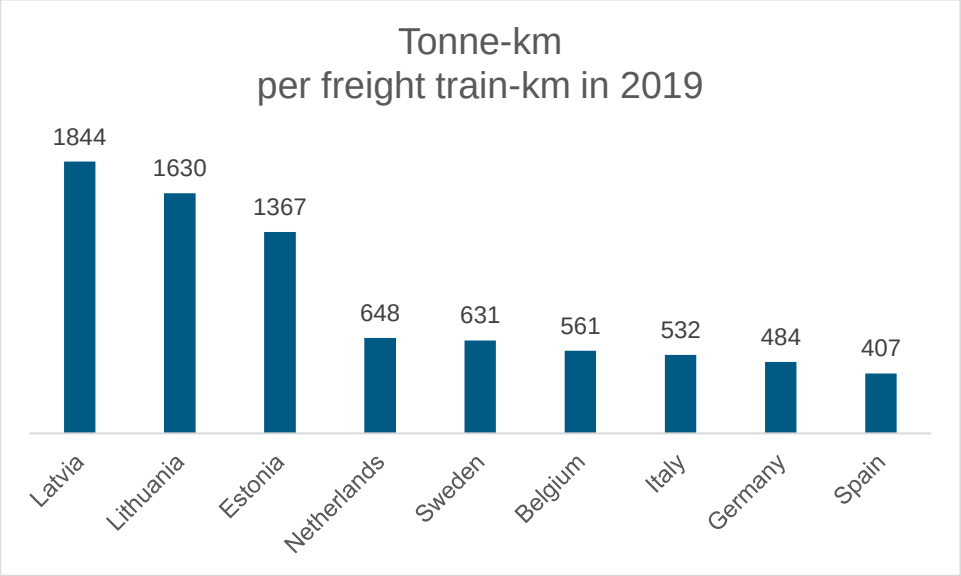
Source: https://www.irg-rail.eu/irg/documents

A.2.1.2. Comparison in the TAC rate for freight per net tonne-km

The comparison below shows there is a significant difference per tonne km per freight train-km. The rate is the highest in the Baltic countries, while Italy, Germany and Spain are lower than European average. Where TAC rates are based on freight trains that are heavy and long (and typically more efficient as a result) as is the case in the Baltic States with East-West traffic in particular it can disadvantage and crowd out lighter and smaller general cargo traffic.

The prevalence of high-tonnage bulk freight traffic in the circumstances of train-km based access charging which disadvantages (or even crowds out) 'lighter' general cargo traffic (containers, intermodal etc).

Figure 6-9 – Comparison of freight by tonne-km



Source: https://www.irg-rail.eu/irg/documents

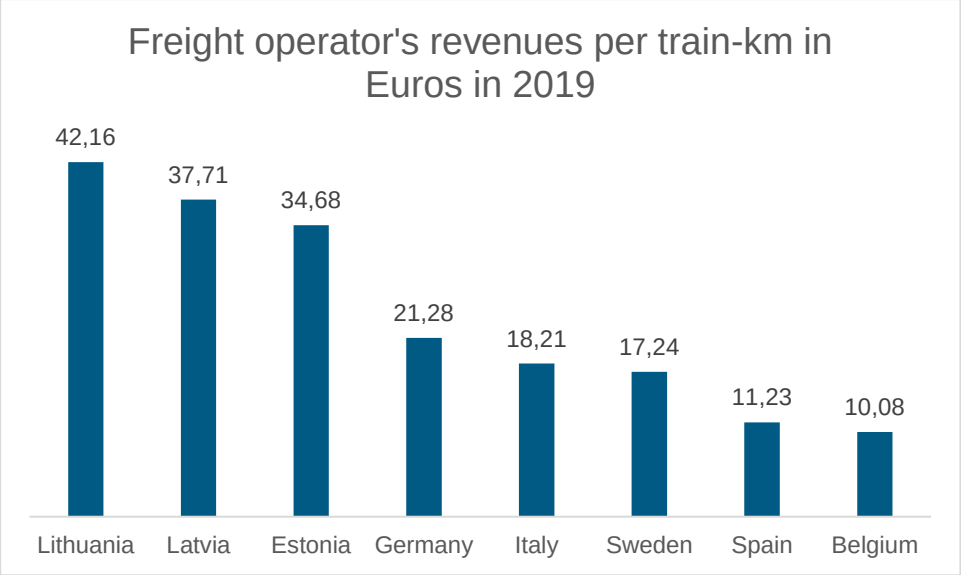
A.2.1.3. Comparison of revenues by freight operators/in the EU

The capacity to raise freight TAC by Infrastructure Managers across Europe depends mainly upon the ability to pay of the rail freight market.

The highest level of revenues per train-km for railway operator are in the Baltic states with 42.16 Euros in Lithuania, 37.71 Euros in Latvia and 34.68 Euros in Estonia. The higher ability to pay is reflected in the higher level of TAC in those nations.

For Baltics this reflects the traditional specialisation in bulk rail freight (mainly, Russian oil and coal) along the East-West corridor, but the trend is a decrease of this flow of traffic.

Figure 6-10 – Comparison of freight operator revenues per train-km



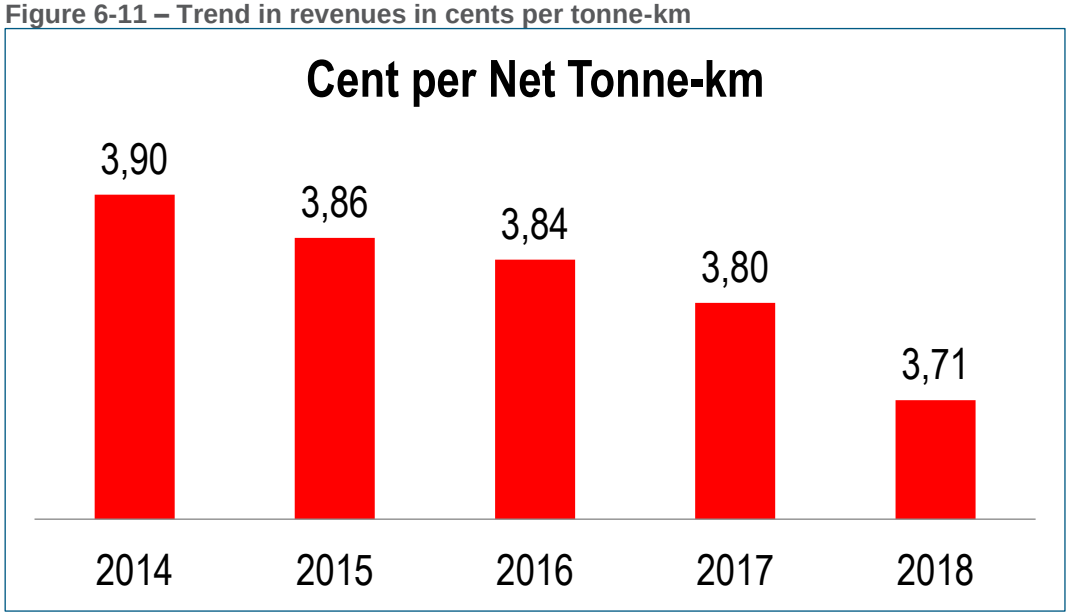
Source: https://www.irg-rail.eu/irg/documents

Germany has a level close to European average (21.23 Euros), while Spain and Belgium are characterised by a low level of revenues for the freight traffic.

These elements could be included in the analysis for the calculation of the ability to pay of the Access Charge because it is a main component for the TAC.

It is also important to understand how sustainable this might be. The best evidence for this, is the rate of change of revenues per net tonne-km of rail freight operators, which at the European level decreased over the last 5 years. In the Baltics high freight railway undertaking revenues have been underpinned by traditional specialisation in bulk rail freight (mainly, Russian oil and coal) along the East-West corridor, however, this market is suffering a rapid decline. At the same time, RB will be orientated North-South and will concentrate on traffic to/from the EU which will be primarily made up of general cargo traffic (containerised. Combined/intermodal etc). It is likely therefore that current high freight income level of freight operators in the Baltics will not be true for operators will not be true for freight operators on RB and EU norms may be more relevant.

Figure 6-11 – Trend in revenues in cents per tonne-km



Source: https://www.irg-rail.eu/irg/documents

Noticeably, across Europe the level of revenue for freight trains is decreasing (as per the Access Charge), and it will be important, in relation to TAC, to take into account the level of revenue for different traffic segments.

Below is a comparison of freight operator revenues per net tonne-km in 2019. Given the relatively high rates per freight train in the Baltic nations we might expect to see similarly high revenue per tonne but that is not the case. If we compare the countries in the analysis, it is possible to see that the highest revenue per tonne is to be found in Germany, followed by Italy. These are probably the most efficient freight operations therefore in Europe. Both are characterised by long and heavy trains and strong competition. There are over 100 registered freight operators mostly operating on short-term contracts. Germany has the highest level of revenues per net tonne-km for the freight operators, while Spain has a high level of revenue even if the revenues per train km are very low. At the opposite the three Baltic States has a low level of revenues per net tonne-km while they have the highest level for the revenues per train km.

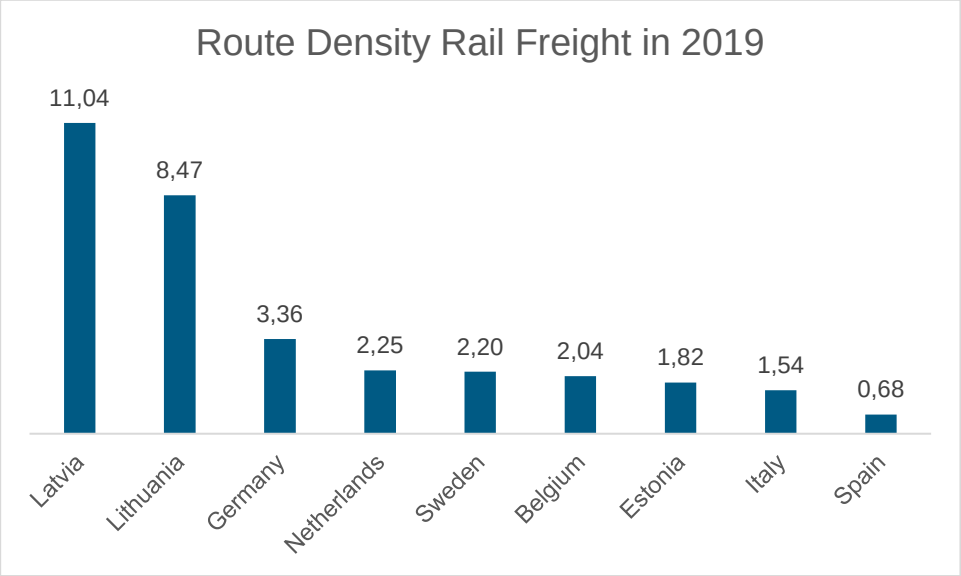
A.2.2. Comparison of density of traffic

This section provides additional information to section 2.6 of the report relating to comparisons of traffic density.

Another useful benchmark element to consider in this comparison is the density of the use of the network for freight and passenger rail in the sample countries.

Latvia and Lithuania have the highest level of density expressed in net tonne-km per kilometre of infrastructure, while the lowest level is for Italy and Spain.

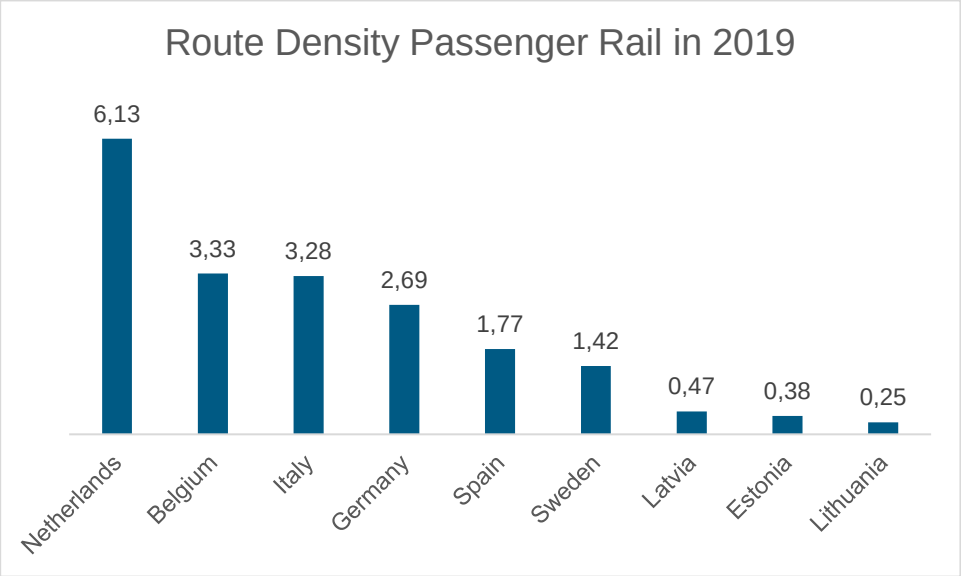
Figure 6-12 – Route density freight



Source: https://www.irg-rail.eu/irg/documents

In terms of passenger market, the density of the network is higher for Netherlands, Belgium, and Italy. The value is expressed in passenger-km for kilometre of infrastructure.

Figure 6-13 – Route density passenger

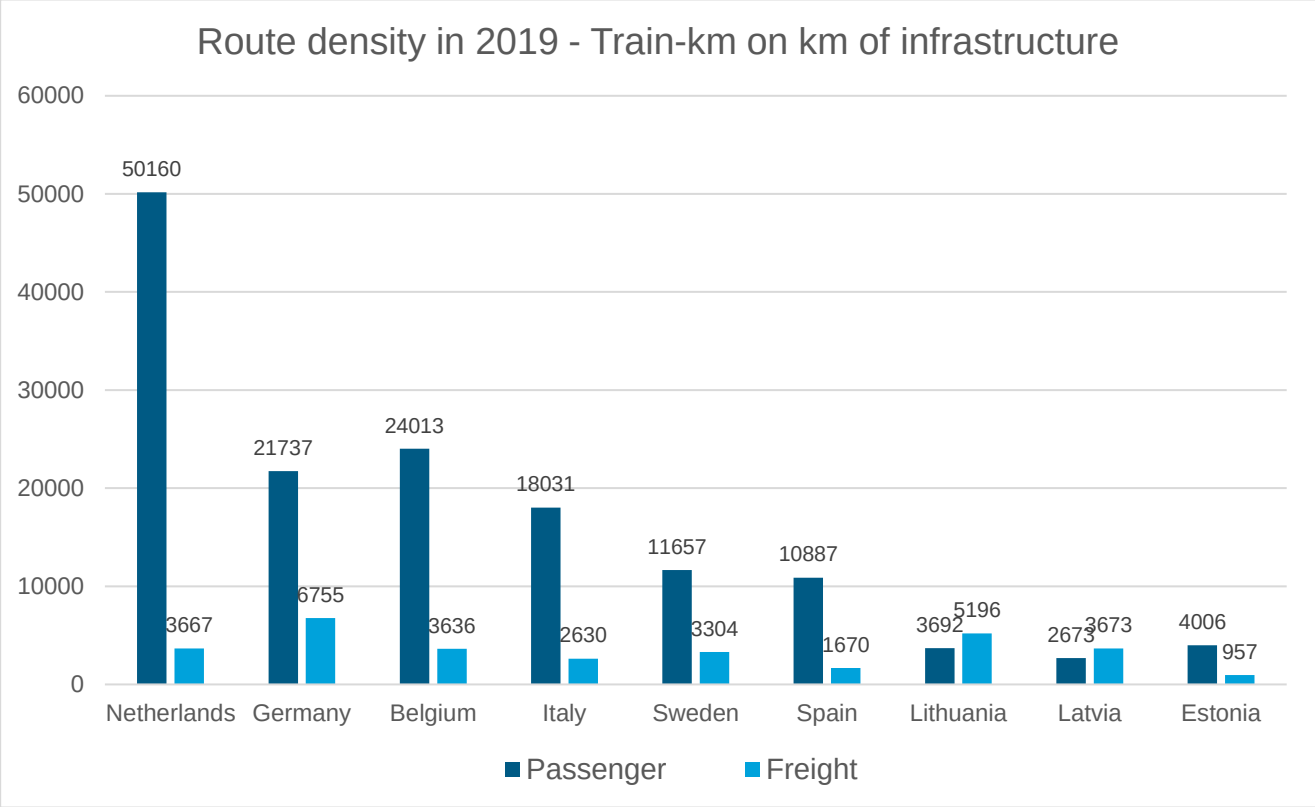


Source: https://www.irg-rail.eu/irg/documents

The lowest level for the passenger traffic is for the three Baltic States, due to a low use of the infrastructure.

It is interesting to analyse the route density also taking in consideration the traffic expressed in train-km on the kilometre of rail infrastructure.

Figure 6-14 – Density for both freight and passenger



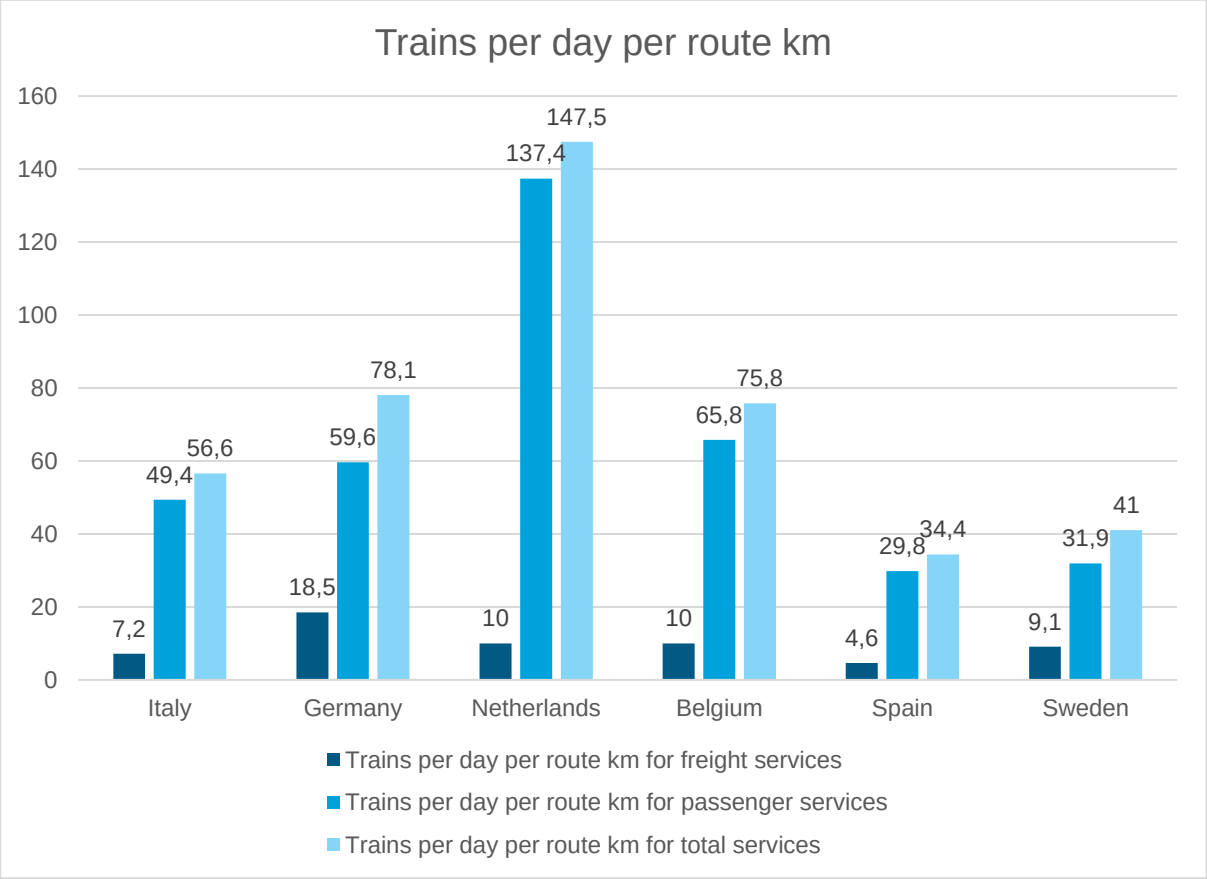
Source: https://www.irg-rail.eu/irg/documents

The only network that has higher density for the rail freight in comparison with the passenger services are Lithuania and Latvia.

These two Baltic States, together with Estonia are also the countries with a higher level of route density for the rail freight except Germany.

The three Baltic States has the lowest level for the route density for passenger, while the Netherlands, Belgium, Germany and Italy has the highest level.

Figure 6-15 – Trains per day per route km



The density of population has an effect on the density of traffic, if we consider the number of trains per day per route km.

The Netherlands and Belgium has the highest number for passenger services, while Germany is able to have 18.5 trains per day per km of route for the freight rail, thanks to the density of the industrial structure of the economy.

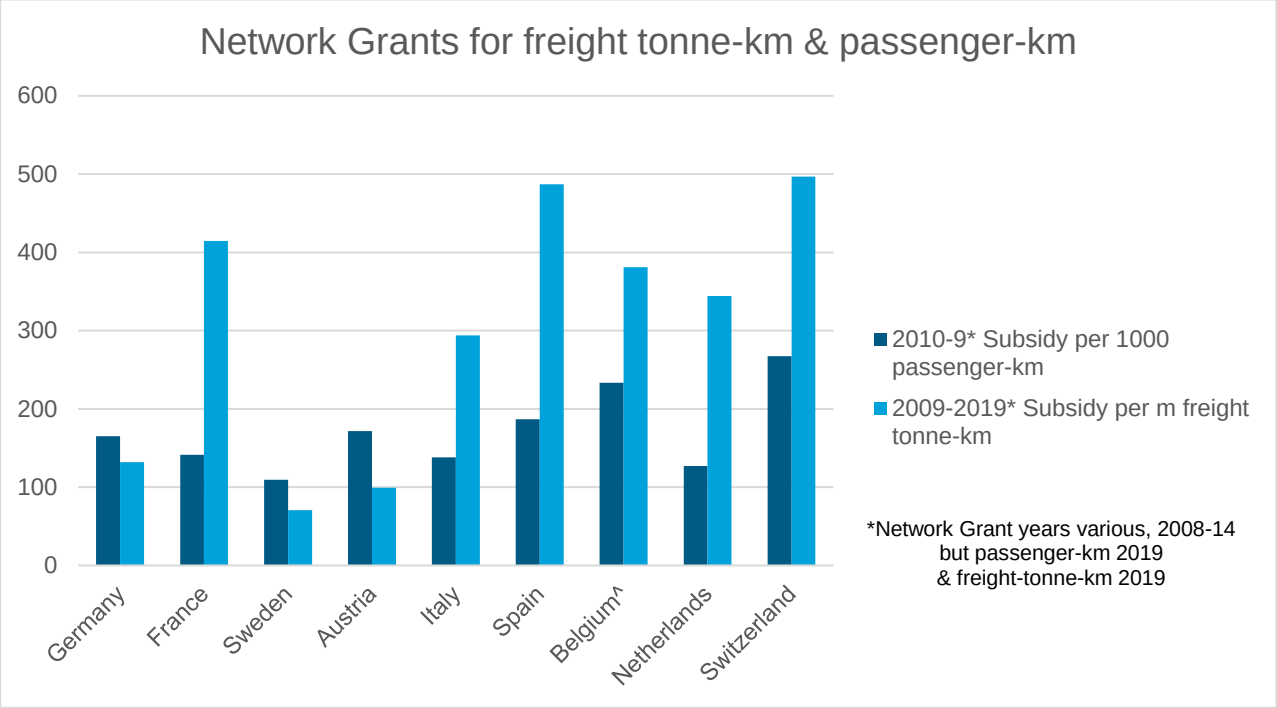
A.2.3. Comparison of Network Grants to the IM

This section provides additional information to section 2.6 of the report relating to comparisons of Network Grants to the IM.

The last element in this benchmarking analysis is the level of the Network Grants to the IM in the different countries. Please note that indirect Network Grants via a concession contract or other mechanism are not included.

The comparison is visually shown in the following figure, where the level of Network Grants is an historic value, while the traffic level has been taken from 2019. As can be seen, Switzerland has the highest level of Network Grants for freight and passengers' services, while Sweden has a very low level of Network Grant for freight and passenger rail services.

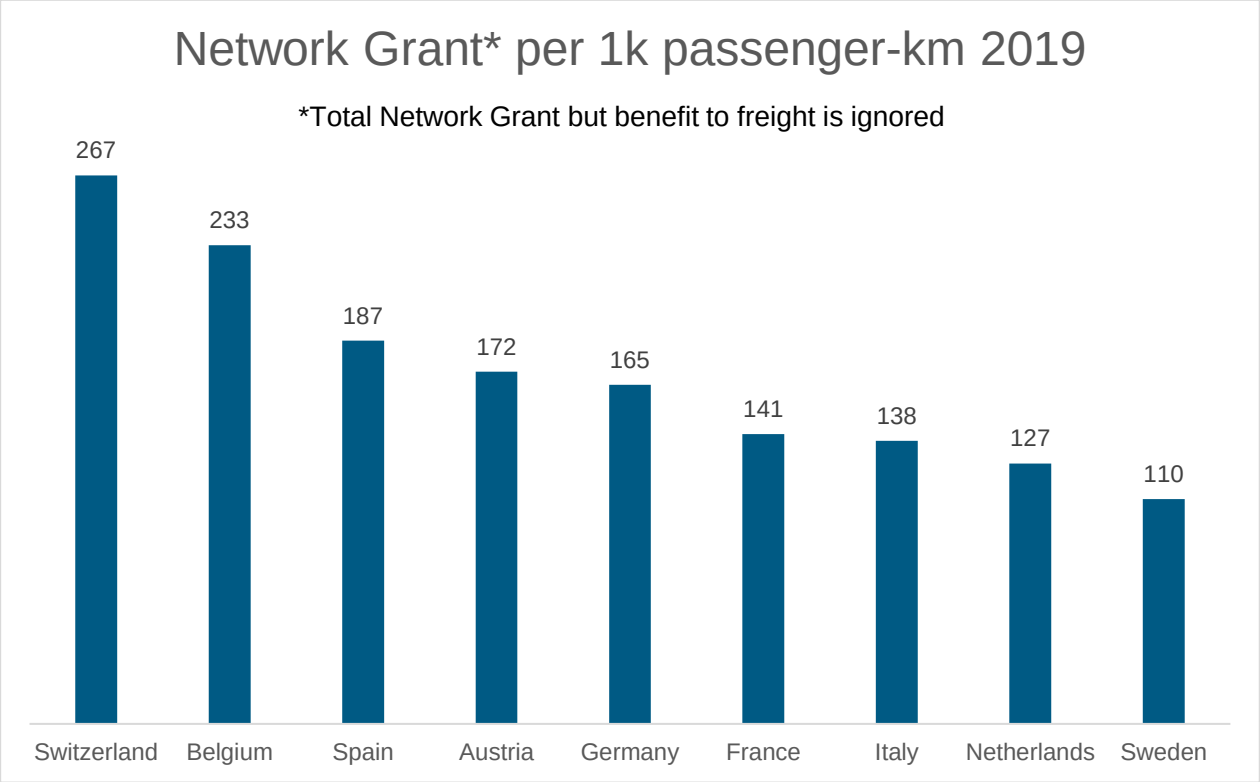
Figure 6-16 – IM Network Grant by freight tonne-km and passenger-km



Six of the nine nations studied shown a higher Network Grant for freight than for passenger services when tonne-km and passenger-km are compared. In all these cases, the rate of Network Grant for freight is much higher than passenger (typically double). The three exceptions are Germany, Sweden and Austria where freight competition is comparatively high, resulting in a lower difference between freight and passenger (around 30% more).

The figure below shows the total infrastructure Network Grant only for the passenger rail services. As can be seen, Switzerland has the highest level of Network Grants while Sweden, Netherlands and Italy have the lowest.

Figure 6-17 – IM Network Grant for passenger only per km



The level of Network Grant has to be taken in consideration when the TAC is fixed by the different regulator and IM.

In Estonia, the IM receives direct Network Grants, while in Lithuania there is the PSO segment that is cross-Network Grants from the rail freight from Belarus.

In Latvia, the regulatory body asked to the IM to calculate what “market can bear”, but PSO services are not able to cover the costs. Losses for the IM are covered by government but not sufficiently and this is the reason why there is a complaint in the court.

A.3. National Comparisons

The following sections provide additional information to section 2.6 for the six different nations.

Because direct comparisons are not always wholly accurate, the section below gives much greater detail on the following European nations.

The nations discussed in turn below are:

- Italy.
- Germany.
- Spain.
- Belgium.
- Netherlands.
- Sweden.

These countries have been chosen due to a combination of available information and present a reasonable spread of different information, in terms of difference between them. We have concentrated on EU nations, therefore mentioned the UK and Switzerland by exception.

These countries have a very different target for the Governments for rail sector and it is reflected in the TAC regime. In particular, Sweden use the SRMC criteria (Short Run Marginal Cost) to have a higher utilisation of the network and at the same time to increase the competition, while Spain would like to recover the full cost. In the other countries, the level of TAC is under the criteria of MC+ (marginal cost plus) that it means that the IMs recovers the direct cost plus a part of the fix cost.

A.3.1. TAC in Italy

The reform of the TAC in Italy was completed in 2015, and, after one year of transition, it has been in operation since 2016.

The TAC in Italy reflect European Legislation and it is therefore divided in two components:

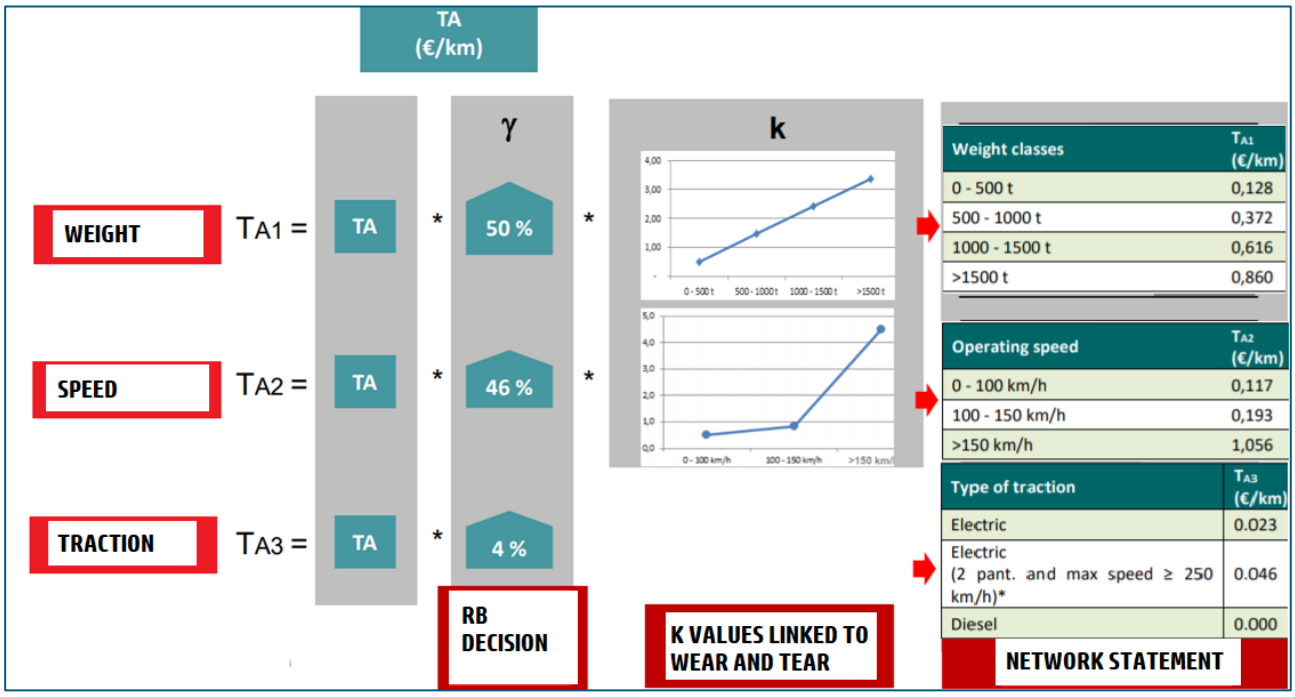
- Component A - Direct Cost.
- Component B - Mark Up.

The Italian system differs from that of the other countries analysed, as the TAC uses 3 variables for the calculation of the Direct Cost, as follows:

- Weight (Ta1).
- Speed (Ta2).
- Type of traction (Ta3)

The decision relating to the weighting of each variable is given by the IM Rete Ferroviaria Italiana (RFI) but under the limitation of the regulatory body, the Authority of Regulation of Transport, in charge to design the railway TAC system.
RFI sets the value for *k*, i.e., the variable linked to the wear and tear of the network in relation to the weight of the train and the speed of the train. Related to the variable *k*, the tariff of the Component A is given to the market, and it is published on the network statement.

Figure 6-18 – TAC in Italy



The Component B of the TAC in Italy relates to the Mark Up and the ability to pay of the Railway Undertaking. The market for the rail services is divided in 8 segments, as shown in the figure below.

Figure 6-19 – Market Segments

Segment	Description
International LH	Passenger trains operating under the INTERNATIONAL OPEN ACCESS system
Premium	Passenger trains operating under the INTERNATIONAL OPEN ACCESS system travelling on sections of the HSL network at speeds in eccess of 250 km/h (see table 6.9)
Basic	Passenger trains operating under the INTERNATIONA OPEN ACCESS system that do not travel on sections of the HSL network at speeds in excess of 250km/h
PSO - LH	LONG DISTANCE passenger trains providing a UNIVERSAL SERVICE
PSO - Reg	REGIONAL passenger trains providing a UNIVERSAL SERVICE
Freight	FREIGHT trains
Technical	NON COMMERCIAL trains: trasporting materials, isolated locomotives, staff shuttles, other shuttles (except for freight shuttles for commercial purposes)
Maritime	Ferry services to/from Sicily or Sardinia

Each of the eight market segments is then divided in sub-segments, and it is summarised in the following tables.

Figure 6-20 – Market Sub Segments

Segment	Description
Top Plus	• Top with service with > 700 seats offered
Top	• PREMIUM services operating a commercial service in Rome and Milan • Operated only on weekdays (not including Saturday) • Seats offered ≤ 700
Top-S Plus	• Top-S with service with > 700 seats offered
Top-S	• PREMIUM services operating a commercial Service in Rome and Milan • Operated on Saturdays • Seats offered ≤ 700
P-base Plus	• P-base with service with > 700 seats offered
P-base	• PREMIUM services operating a commercial service in Rome or Milan • PREMIUM services not operating a commercial service in Rome and Milan • Seats offered ≤ 700
P-light Plus	• P-light with service with > 700 seats offered
P-light	• P-base, but with the use of the High Service Level network for less than 30% of the route travelled
Promo - P	• New commercial services, defined in the catalogue by the IM. The catalogue and fees are defined in a subsequent edition of the NS
Night	• NATIONAL and INTERNATIONAL FREIGHT services • Travelling predominantly at NIGHT (≥ 51% of the route in the 22 – 06 slot)
JO.INT	• INTERNATIONAL FREIGHT SERVICES • Travelling predominantly during the DAY (< 51% route in the 22 – 06 slot)
NA.DA. Top	• NATIONAL FREIGHT services • Travelling predominantly during the DAY (< 51% of the route in the 22 – 06 slot) • Distance travelled ≥ 100 km and < 800 km
NA.DA. Base	• NATIONAL FREIGHT services • Travelling predominantly during the DAY (< 51% of the route in the 22 – 06 slot) • Distance travelled < 100 km and ≥ 800 km
Promo - M	New commercial services, defined in the catalogue by the IM and in accordance with the requirements set out in the TRA decision no.17/2018.
Hub Node-Sprint	• REGIONAL node services (Using at least part of the Metropolitan network - see Table 6.10) • Commercial services in at least one of the Hub stations shown in Table 6.11 • Operating speed ≥ 75 km/h
Hub Node	• REGIONAL node services (Using at least part of the Metropolitan network - see Table 6.10) • Commercial services in at least one of the Hub stations shown in Table 6.11 • Operating speed <75 km/h • Operated every day except Sunday
Hub Node – Holy	• REGIONAL node services (Using at least part of the Metropolitan network - see Table 6.10) • Commercial services in one of the Hub stations shown in Table 6.11 • Operating speed < 75 km/h • Operated on Sundays and holidays
Ring Node	• REGIONAL node services (Using at least part of the Metropolitan network - see Table 6.10) • No services in any of the stations listed in Table 6.11 • Operated every day except Sunday and holidays
Ring Node – Holy	• REGIONAL node services (Using at least part of the Metropolitan network - see Table 6.10) • No services in any of the stations listed in Table 6.11 • Operated on Sundays and holidays
No Node	• REGIONAL services the path of which does not concern sections of the metropolitan network • Operated every day except Sunday and holidays
No Node – Holy	• REGIONAL services the path of which does not concern sections of the metropolitan network • Operated on Sundays and holidays
Promo - R	New commercial services, defined in the catalogue by the IM. The catalogue and fees are defined in a subsequent edition of the NS

[21]

For every single sub-segment are given the ability to pay.

The ability to pay is calculated by RFI, based on the number of the railway operators and check by the Authority of Regulation of Transport.

Figure 6-21 – Type of service

Type of service	T_B (€/km)	
Premium	Top Plus	5,890
	Top	5,371
	Top-S Plus	4,847
	Top-S	4,416
	P-base Plus	4,524
	P-base	4,150
	P-light Plus	4,385
	P-light	4,023
Basic	Open Access - National - Basic	3,412
International	Open Access - International	4,099
PSO – Long distance	OSP - LP - Day	2,907
	OSP - LP - Night	1,172
PSO – Regional	Nodo Hub-SPRINT	2,936
	Nodo Hub	2,866
	Nodo Hub-HOLY	2,549
	Nodo Ring	2,781
	Nodo Ring - HOLY	2,481
	No Nodo	1,649
	No Nodo - HOLY	1,385
Freight	JO.INT.	2,319
	NA.DA. Top	1,952
	NA.DA. Base	1,161
	Night	0,923
Technical	Technical	1,358
Ferry*	Ferry	227,265
Promo**	Premium	0,000
	Freight	0,000
	PSO Regional	0,000

The level of the Component A for a High-Speed service is around 1.5 Euros per train km, while that for freight train (more than 1500 tonnes) it is around 1 Euro per train km. The Direct Cost for conventional passenger rail is around 0.32 Euros.

The component B is very different between typology of trains and the sub-segments that are created.

A High-Speed service is at around 5.3 Euros per train km to pay as component B, while a freight train could pay from 2.3 Euros for an international service to 0.9 Euros per a night train. Conventional passenger services pay 3.41 Euros per train-km in open access and between 1.38 and 2.93 Euros as per component b.

A.3.1.1. Regional network

In Italy another IM (FerrovieNord), manages a small part of the network in the Lombardy region.

FERROVIENORD's tariff system is determined in accordance with the provisions of Legislative Decree 112/2015, the same used for RFI.

As for RFI, the Access Charge is calculated as the sum of two components A and B

- Component A related to the wear and tear of the infrastructure (track and contact line).
- Component B related to the ability to pay off the market segments, simplified for the characteristics of the FERROVIENORD network.

[21] Mercitalia Fast is a night service and is charged a higher Direct Cost.

Component A of the toll is divided into three additive sub-components A1, A2, A3:

A = A1weight + A2speed + A3contact line

Where:

- Sub-component A1 correlates track wear to the blocked weight classes of the train.
- Sub-component A2 correlates track wear to the train running speed classes.
- Sub-component A3 is related to the wear of the catenary contact line.

Table 6-1 - Component A for FERROVIENORD network

Component	Type of traffic	Euro/km
Component TA1	Up to 500 tonnes	0.0626
	Over 500 tonnes	0.1863
Component TA2	Up to 90 km/h	0.0578
	Over 90 km/h	0.0578
Component TA3	Electric traction	0.0428
	Diesel traction	0.000

- Component B of the toll is related to the ability to pay of market segments.

Table 6-2 – Component B for FERROVIENORD network

Service	Component B
SFR trains	2.4580
SFR extra trains	2.7037
Freight trains	2.9496

A.3.2. TAC in Germany

DB Netz AG is the IM in Germany.

The train-path kilometre charge for the MAP is calculated using the train-path kilometres in the relevant market segment multiplied by the relevant charge for the MAP in this market segment.

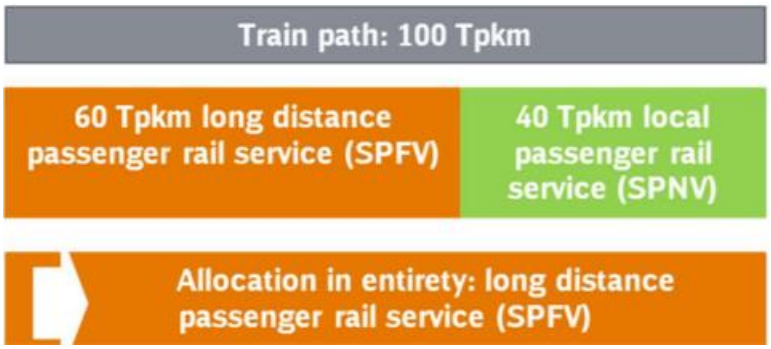
The segmentation is a key element for the TAC and the train-path application are related to long-distance passenger rail services, local passenger rail services or freight rail services.

The charge for the MAP per market segment includes the Direct Costs of train operation per market segment, and a Mark Up to cover the full costs (full-cost surcharge), according to the relative viability of the relevant market segment as well as possible additional elements.

The calculation of the charge for the MAP is based on the contractually agreed train-path kilometres and the market segments are identified by DB Netz AG based on rail transport services.

When the service is related to a different segment, the train-path is allocated to the service that constitutes the main part in terms of train-path kilometres.

Figure 6-22 – Train-path constitution



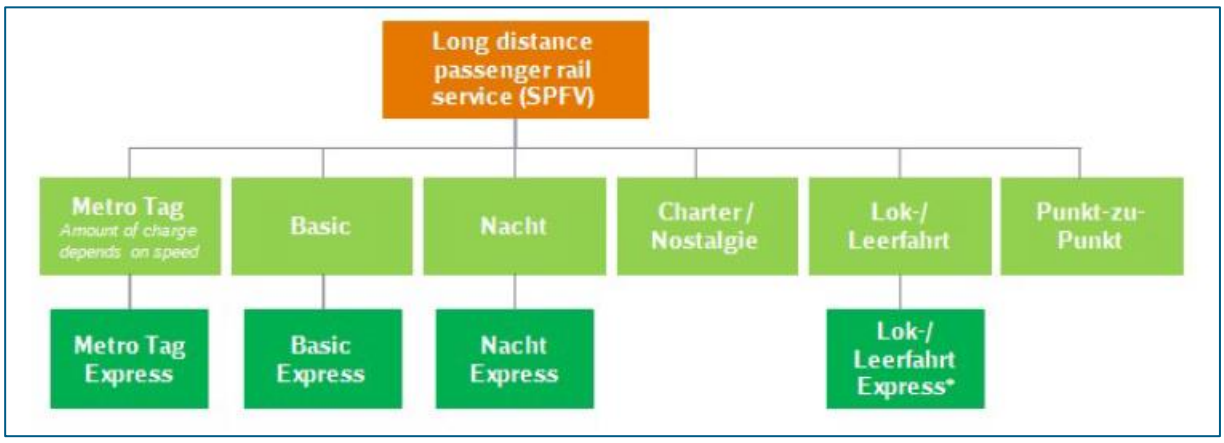
The direct cost calculation is based on train operation so that changes in traffic volumes may result in changes in the service, reflected in the costs. The correlation between traffic volumes and costs incurred by DB Netz is based on:

- Timetable cost pool.
- Operation cost pool.
- Track Maintenance cost pool.
- Track Depreciation cost pool.

The charge for the MAP includes a Mark Up per market segment to accommodate the costs incurred as a direct result of train operation.

1. This markup contributes to cover the total fixed costs incurred in providing the MAP. They are allocated between the market segments based on ability to pay.
2. The MAP depends on the average speed, commercially rounded to whole kilometre per hour. It results of dividing the train-path kilometres by the scheduled net journey time (journey time without stops at intermediate stations).
3. The long-distance passenger rail services are divided in 6 subsegments and 4-night subsegments.

Figure 6-23 – Passenger service segments



The "Metro Tag" market segment covers all train-path uses falling under long-distance passenger rail services which:

- Run between at least two metropolitan stations and/or high-volume border points (geographical criterion)
- Run from Monday to Friday with the exception of national holidays in the period from 6amto 8pm and from Saturday to Sunday and on national holidays from 9am to 8pm (time criterion).

The Basic market segment covers all train-path uses falling under long-distance passenger rail services which either do not run between two metropolitan stations and/or high-volume border points (geographical criterion) and run from Monday to Sunday including national holidays in the period from 6am to 11pm (Time criterion), or run as long-distance passenger rail service trains from Monday to Sunday including national holidays in the period from 8pm to 11pm (Time criterion) and on Saturdays and Sundays and national holidays in the period from 6am to 9am (Time criterion).

The market segment "Nacht" comprises all long-distance passenger rail services which run in the period between 11pm and 6am.

"Charter trains" are train path usages in the long-distance passenger rail services sector independent of temporal and geographical criteria that are offered for a particular purpose that is the same for and commonly pursued by all participants.

Lok-/Leerfahrt (Locomotive/Empty Run).

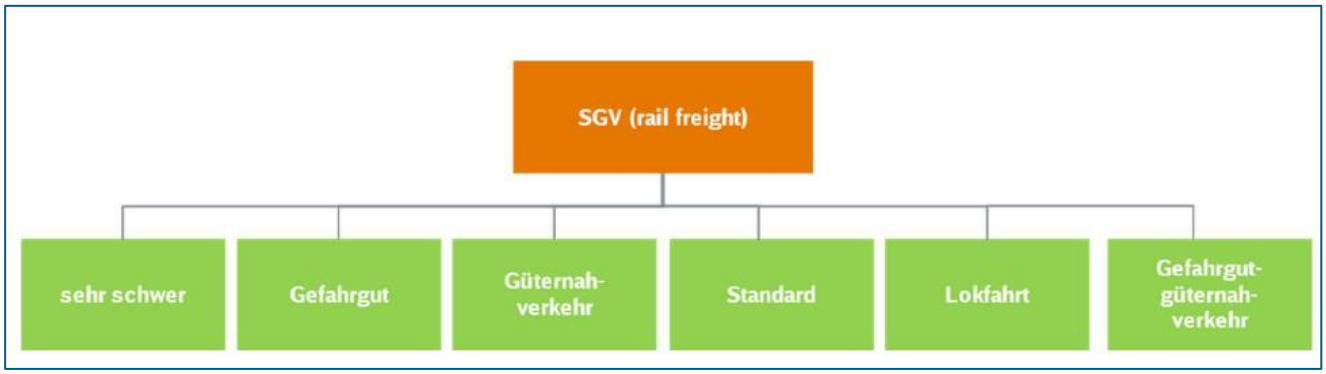
The market segment "Punkt-zu-Punkt" comprises all train path usage between 6am and 11pm that satisfy some specific criteria of time, speed and point to point.

The regional services are divided in two subsegments:

- Load run passenger services.
- Locomotive/empty runs.
- The Track Access Charge is different in every Lander. The lower is in Saarland, while the higher is Brandeburg. The differences are due to the component B, the Mark Up.

There are six rail freight segments and there are also two planning characteristics and two operational characteristics.

Figure 6-24 – Freight service segments



Additional freight rail segments are produced by combining the aforementioned segments with particular planning (Z-Flex and R-Flex) or operational characteristics (Express and Schnell).

The "Sehr schwer" market segment comprises all train-path uses where the wagon-train weight exceeds 3000 tonnes.

The "Gefahrgut" market segment comprises all train-path usage where the relevant train is transporting only dangerous goods and if the train travels further than 75 km on a train path or has a rake of more than 370 metres, or the wagon-train weight of up to 3000 tonnes is not exceeded.

The "Güternahverkehr" market segment comprises all train path usage where the relevant train travels no further than 75 km on a train path, has a maximum rake of 370 metres, weighs no more than 3000 tonnes and does not exclusively transport dangerous goods.

The "Standard" market segment contains all train path uses which are not covered by other segments.

The "Lokfahrt" market segment for rail freight transport comprises train path usage with locomotives; the train configuration may not consist of any detachable wagons.

The "Gefahrgutgüternahverkehr" market segment comprises all train path usage where the relevant train travels no further than 75 km on a train path, has a maximum rake of 370 metres, weighs no more than 3000 tonnes and does exclusively transport dangerous goods.

In general, as is the case for most Network Statements, the annex of the network statement shows the differences between the Direct Cost and the Mark Up.

The minimum prices are possible to reach for other commercial passenger lines, where the lower Access Charge is 3.72 Euros per train km. Direct Cost component is around 0.72 Euros per train-km, while the component B around 2.46 Euros per train km.

The maximum track Access Charge for the conventional passenger services is 7.02 Euros per train km, with 1,15 Euros per train km of Direct Cost and 5.87 Euros per train km for the Mark Up component.

For the High-Speed rail, the minimum level for the direct cost is 1.15 Euros per train km and the lower Mark Up is 11.86 Euros per train km.

The lower TAC for the HSR is 13.01 Euros per train km.

The highest TAC for the HSR, where the Direct Cost is 1.15 Euros per train km while the Mark Up is 13.86 Euros per train km. In this case, the total TAC is 15.01 Euros per train km.

In the case of rail freight services, the lowest TAC is 1.71 Euros per train km, with 0.92 Euros per train km for the direct cost and 0.79 Euros per train km for the Mark Up component.

The highest TAC is 5.63 Euros per train km. The direct cost component is 1.5 Euros per train km, while the Mark Up is 4.13 Euros per train km.

A.3.3. TAC in Spain

In 2013, ADIF (the IM), was split into two different parts:

- ADIF AV, the IM of the High-Speed Line.
- ADIF, the IM of the traditional line.

The assets of the company were also split: 72 per cent of the assets was given to ADIF AV and the rest to ADIF.

The structure of the TAC for the use of the network is based on the following components:

1. Charge for the reservation of capacity.
2. Access Charge for the use of the network.
3. Access Charge Mark Up (linked to number of seats of the train).

The component related to Direct Cost is the Access Charge to use the network, while the other three components are related to the Mark Ups.

In Spain it is possible to divide the revenue of TAC of traditional rail in four different segments:

1. VL, long distance services, which is further splint into further sub-segments:

   VL1, Long distance services included High-Speed rail.

   VL2, Long distance services with at least 10 per cent of the route with mixed gauge the High-Speed rail. In Spain there is a mix of gauge, with Iberian Gauge being present in Valencia. Where services have this mixed usage, and at least 10% of their route consist of Iberian gauge, then services are categorised as VL2.

   VL3, Long distance services with a route of more than 700km with no stop. In Spain services High-Speed services that do not stop at Madrid, such as the Seville – Barcelona service, are categorised differently.
2. VCM, for regional services, medium distance services (less than 300 km) and PSO services.
3. VOT, Technical trains.
4. M, freight trains.

There is also a differentiation for the typology of the line:

1. A, the being a line that has a speed of more than 200 km per hour for more than 2/3 of the route. Further to this, A lines can be split into three categories:

   Madrid-Barcelona-Border with France.

   Madrid-Toledo-Sevilla-Malaga.

   Other lines.
2. Other than A, all the other typology of the lines.

For the reservation charge there is a difference for the typology of the line (A and other than A) as well for Access Charge for the use of the network.

The Access Charge and Mark Up also have differentiations within the A lines (three categories).

The tables below show how TAC is split in Spain, with the first table showing the Direct Costs, the Second table the Mark Up, and third table another type of Mark Up, which shows how Mark Up can be depending on certain lines/routes.

Table 6-3 – Direct Cost for utilising the network

	VL1	VL2	VL4	VCM	VOT	M
	Euro per train km					
A lines	1.6767	1.4873	1.7350	1.6069	1.7776	0.4446
Other than A lines	0.5082	0.5133	0.5118	1.3851	0.4110	0.0724

Table 6-4 – Mark Up for using the network

	VL1	VL2	VL4	VCM	VOT	M
	Euro per train km					
A lines	3.6414	3.0043	3.7855	2.3316	0.9797	1.1055
Other than A lines	0.7247	0.7320	0.7299	1.9752	0.5865	0.1032

As previously mentioned, there is an additional Mark Up for using certain lines/routes in Spain, which can be seen below.

Table 6-5 – Mark Up for using different types of lines

	VL1	VL2	VL4	VCM	VOT	M
A lines	Euro per train km					
Madrid-Barcelona-French Border	1.7611	0.0000	0.3023	0.4959	0.0000	0.0000
Madrid-Sevilla	0.8647	0.0000	0.1962	0.3218	0.0000	0.0000
Other A line	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other than A lines	Euro per train km					
	0.0000	0.0000	0.0000	2.3597	0.0000	0.0000

The minimum prices are possible to reach for other commercial passenger lines, where the lower Access Charge is 1.438 Euros per train km.

In this case, the Direct Cost component is around 0,73 Euros per train-km, while the component B around 0.51 Euros per train km.

The maximum track Access Charge for the conventional passenger services is 5.71 Euros per train km, with 1.97 Euros per train km of Direct Cost and 3,74 Euros per train km for the Mark Up component.

For the High-Speed rail, the minimum level for the direct cost is 3 Euros per train km in the Madrid-Sevilla line and the lower Mark Up is for the Madrid-Sevilla with 1.49 Euros per train km.

The lower TAC for the HSR is for the Madrid-Sevilla with a total cost of 5.27 Euros per train km.

The highest TAC for the HSR is for Madrid-Barcelona route where the direct cost is 3.79 Euros per train km while the Mark Up is 17.57 Euros per train km. In this case, the assumption is a train with a capacity of 900 seats and the total track Access Charge is 21.36 Euros per train km.

For the rail freight, Spain has one of the lower level of TAC in the EU. For some lines (as seen in the tables above) this is 0.17 Euros per train km, including 0.1 Euros per train-km for the Direct Cost and 0.07 Euros per Mark Ups. These low Direct Costs are currently being discussed at Governmental level in Spain, it is not well explained in the Spanish regulation as to why these levels are low.

The maximum TAC level for the freight trains is around 1.56 Euros per train km, with 1.1 Euros per train km for the Direct Cost and 0.45 Euros per train km for the Mark Up.

The TAC revenue has significantly grown in the last year, due to the increase of the traffic on the High-Speed network. RENFE decided to decrease the yield, resulting in a large rise in traffic in the past years.

The arrival of competition in the High-Speed rail mark in Spain is also increasing the pressure for the Government to change the structure of the track Access Charge.

RENFE increased the number of trains in operation (increase of productivity).

It is possible to see the decrease of the yield in the High-Speed in Spain from 2010 to 2019.

The yield decreases from 13.5 Eurocents in 2010 and 2011 per passenger KM (135 Euros per 1000 KM) to 10.5 Eurocents per Pax KM in 2019 before covid19 pandemic.

The arrival of competition is reducing the average price of tickets by around 20/30 per cent, which is putting to question a revision of the track Access Charge and the business sustainability of the railway.

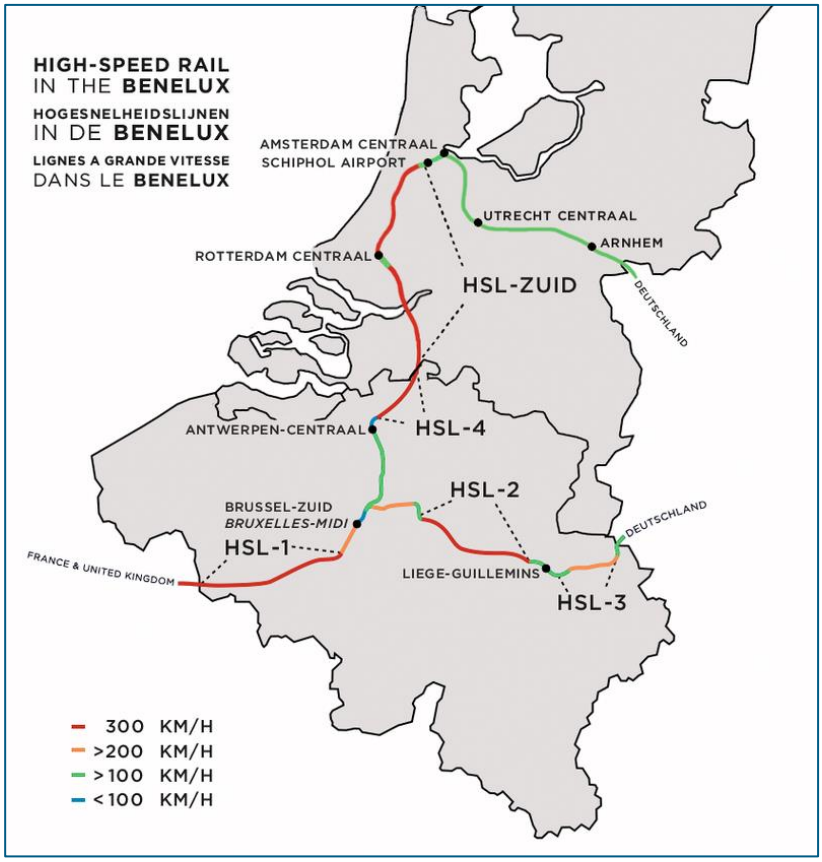
The capacity allocation was a key element to enable a competitive High-Speed rail sector with a tender for the slots that were assigned to three railway operators.

A.3.4. TAC in Belgium

Infrabel is the IM of the Belgian railway infrastructure network, with the regulation for the TAC coming from European Commission and Directive 2012/34, and the implementation of the regulation 2015/909 on Direct Cost.

A rail network is considered High-Speed where speeds are higher than 220 km per hour, whereby there are 4 High-Speed lines connecting France and the Netherlands.

Figure 6-25 – TAC system in the Benelux

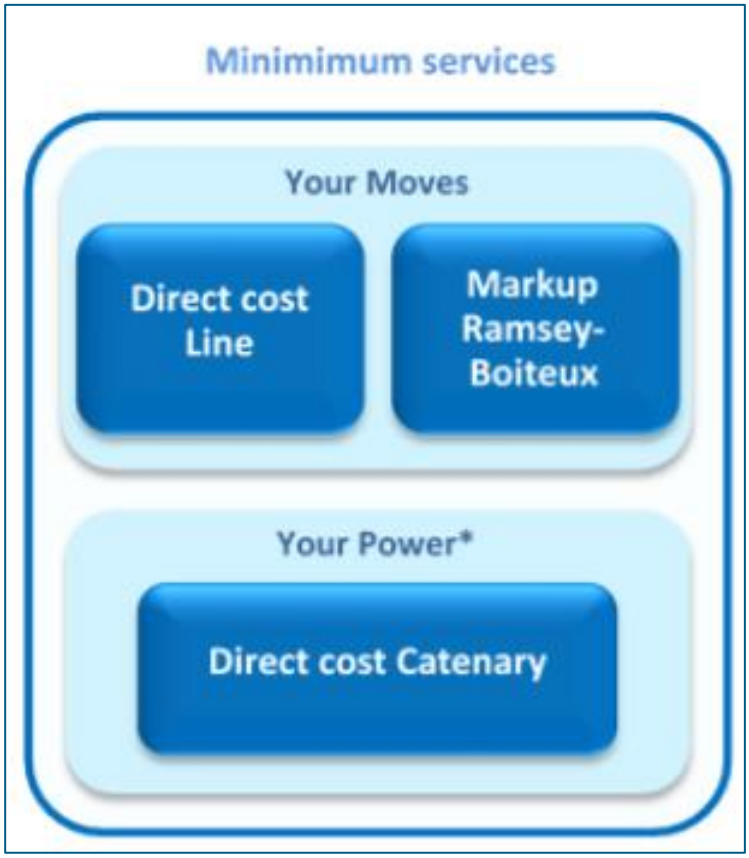


The TAC system in Belgium is divided in 3 parts:

- Direct Cost.
- Mark Up.
- Direct Cost of catenary.

The Direct Cost is linked to the network usage, while the markup is defined by Ramsey-Boiteux[22] pricing method, where the price markup over marginal cost is inverse to the price elasticity of the demand. It is important to underline that the Mark Up is not applied to rail freight but only to passenger trains[23] (both conventional and High-Speed).

Figure 6-26 – TAC in Belgium



The market segmentation is divided in 6 different segments:

- Passenger in PSO.
- Passenger in open market.
- Freight.
- High-Speed[24].
- Other trains[25].
- Tourist trains[26].

In addition, there are sub-segments linked to the time of use of the network:

- Weekday off-peak hours: 7 pm to 5.59 am.
- Weekday peak hours: 6 am to 8.59 am and 3 pm to 6.59 pm.
- Weekday normal hours: 9 am to 2.59 pm.
- Weekday hyper-peak: in some part of the north-south line from 8 am to 8.59 am and from 4 to 4.59 pm.

[22] This pricing method raises individual prices above marginal cost in according to each service's price elasticity of demand. Mark-ups above marginal cost are lower for services with more elastic demand, and conversely mark-ups are greater for services with more inelastic demand.
[23] The touristic train has a different TAC regime and they pay 1 Euros per train km.
[24] Eurostar is considered a high speed service.
[25] Such as maintenance, and empty trains.
[26] Historical trains.

- Weekend Days: 6 am to 6.59 pm.
- Weekend Nights: 7 pm to 5.59 am.

The Direct Cost is applied to all segments, excluded the touristic trains, and it is the same for all the segments. The Direct Cost is linked to the use of the network and the tariff is 1.72EUR per km.

The table below summarises the Mark Up component of the TAC by traffic volumes and time period segment.

Table 6-6 – Mark Up by traffic volumes and time period

	Off-peak hours	Normal hours	Weekend night	Weekend day	Peak	Hyper-peak
	Monday to Friday (19h, 6h)	Monday to Friday (9h, 15h)	Saturday, Sunday and holidays (19h, 6h)	Saturday, Sunday and holidays (6h, 19h)	Monday to Friday (6h, h) and (15h, 19h)	The part in hyper-peak of a train crossing the NSL between (8h,9h) or (16h,17h)
Very low **Lines with very little traffic**	0.125229	0.308406	0.255172	0.505554	1.308766	NA
Low **Lines with little traffic**	0.241864	0.595649	0.492834	0.976419	2.527728	NA
Moderate **Lines with average traffic**	0.303996	0.748661	0.619433	1.227244	3.177057	NA
High **Lines with high traffic**	0.463938	1.142560	0.945342	1.872943	4.848629	NA
Very high **Lines with very high traffic (except North-South Link)**	0.826353	2.035089	1.683812	3.336025	8.636221	NA
NSL **North-South Link**	0.826353	2.035089	1.683812	3.336025	NA	13.206489
High Speed Services	1.917058	4.622046	3.890166	7.707328	19.942888	30.496618

The TAC in Belgium is not able to reflect different variables for the Direct Cost and it is a simple average for all of the railway sector.

The lower track Access Charge for a conventional passenger train 1,85 Euros per train km, with 1,72 of direct cost and 0,13 Euros of Mark Up.

In the case of lines with very high traffic, the track Access Charge is 10,35 with 1,72 Euros of direct cost and 8,64 of Mark Up.

For the High-Speed rail, there is differentiation for the hour of running of services. The lowest track Access Charge is 3,64 Euros per off-peak hours (1,72 Euros for direct cost and 1,92 for Mark Up), while for the peak hours, the track Access Charge is 21,66 Euros.

In the case of rail freight services, the Mark Up is zero and the direct cost is always 1,72 Euros per train km. In Belgium, the ability to pay for the rail freight sector is zero, while there are no differences for mass or speed of the trains, as in other countries.

A.3.5. TAC in Netherlands

ProRail is the IM in the Netherlands where Directive 2012/34 was implemented with a decree of the King of the 21st of November 2015.

ProRail has a tariff regulation for all the customer using the infrastructure network with a differentiation for the typology of the use of the network in some case.

The services by ProRail are classified as follows:

1. MAP.
2. Service facilities.
3. Supplementary services.
4. Ancillary services.
5. Levy or discounts.

ProRail applies a cancellation charge in the case that a requested train path is cancelled or that an agreed train path is not used. This encourages efficient use of the network and avoids operators using track access capacity without paying and preventing others from using that capacity.

For the direct cost, ProRail covers the incremental operation cost of the trains for the infrastructure whilst the costs that are not directly related to the use of the infrastructure are not included in the MAP.

By 2022, the structure of the TAC regime will be changing, with the use of stations is not included, but it is included as an “extra levy” for the different typologies of traffic.

The MAP is linked to a single variable, the weight of the trains.

Table 6-7 – Direct Cost by weight

Weight	TAC (per TKM)
<120 tonnes	0.8149
From 120 to 160 tonnes	1.0187
From 161 to 320 tonnes	1.2958
From 321 to 600 tonnes	1.801
From 601 to 1600 tonnes	2.893
From 1601 to 3000 tonnes	3.4798
>3001 tonnes	3.7732

An Extra levy charge, introduced from 2022, is related to the markup component of the TAC.

Table 6-8 – Breakdown by PSO, other passenger and freight

Weight	PSO	Other passenger	Freight
<120 tonnes	0.1572	0.0841	0.0943
From 120 to 160 tonnes	0.1965	0.1052	0.1178

From 161 to 320 tonnes	0.2499	0.1338	0.1499
From 321 to 600 tonnes	0.3474	0.1859	0.2083
From 601 to 1600 tonnes	0.558	0.2987	0.3347
From 1601 to 3000 tonnes	0.6712	0.3592	0.4026
>3001 tonnes	0.728	0.3895	0.4365

HSL levy fixed the tariff for the use of the route sections Hoofddorp – Rotterdam West and Barendrecht – Belgian border.

The High-Speed network cost 6.9 billion Euros with a PPP scheme.

The levy is linked to the cost that the Infrastructure Manager has to recover are:

- €62.2 million in 2015.
- €63.8 million in 2016.
- €72.6 million in 2017.
- €80.3 million in 2018.
- €86.1 million in 2019.
- €91.7 million in 2020.
- €97.2 million in 2021.
- €100.8 million in 2022.
- €104.4 million in 2023.
- €123.7 million in 2024.

The minimum prices are possible to reach for other commercial passenger lines, where the lower Access Charge is 0.89 Euros per train km. In this case, the train has a weight lower than 120 tonnes. The Direct Cost component is around 0,81 Euros per train-km, while the component B around 0.08 Euros per train km.

The maximum track Access Charge for the conventional passenger services is 2,16 Euros per train km, with 1.81 Euros per train km of Direct Cost and 0.35 Euros per train km for the Mark Up component.

For the High-Speed rail, the minimum level for the direct cost is 1.29 Euros per train km and the lower Mark Up is 12.5 Euros per train km.

The lower TAC for the HSR is 13.79 Euros per train km.

The highest TAC for the HSR, where the direct cost is 1.8 Euros per train km while the Mark Up is 12.61 Euros per train km. In this case, the total track Access Charge is 14.41 Euros per train km.

In the case of rail freight services, the lowest track Access Charge is 2.01 Euros per train km, with 1.8 Euros per train km for the direct cost and 0.21 Euros per train km for the Mark Up component.

The highest track Access Charge is 4.21 Euros per train km. The direct cost component is 3.77 Euros per train km, while the Mark Up is 0.44 Euros per train km.

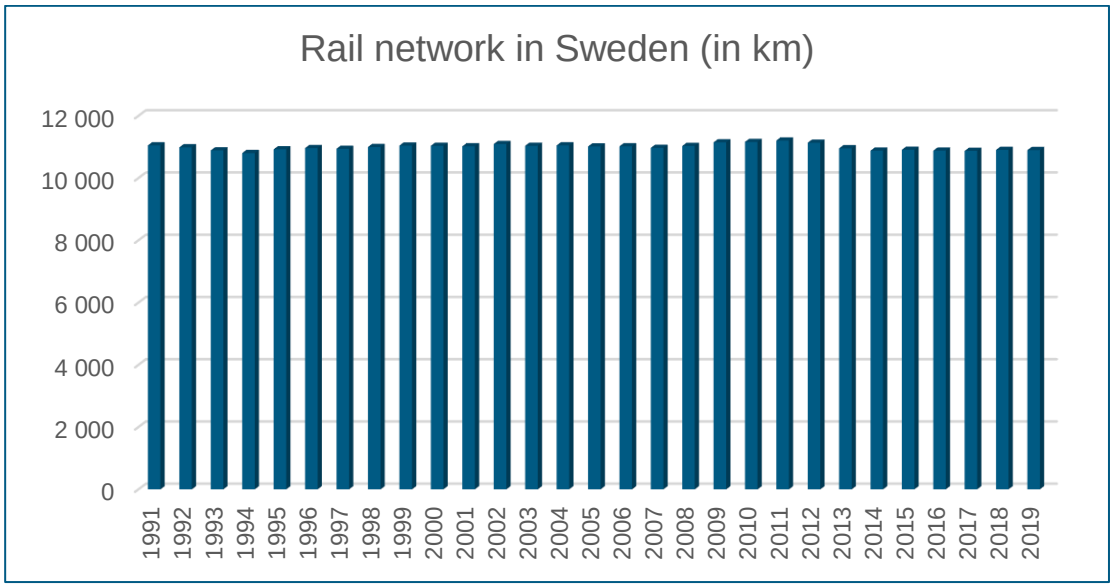
A.3.6. TAC in Sweden

Sweden started its liberalisation process in in 1988 with the separation of the IM and the railway companies.

The IM in Sweden is Trakifverket, which also manages the road infrastructure.

The rail network in Sweden around 11 thousand kilometres long with little change taking place in the last 30 years.

Figure 6-27 – Rail KM in Sweden since 1991



The most important new infrastructure scheme undertaken in the last 20 years is the Oresund Link (between Sweden and Denmark). It cost 4.9 billion Euros and this infrastructure has a differentiation for the TAC for freight services.

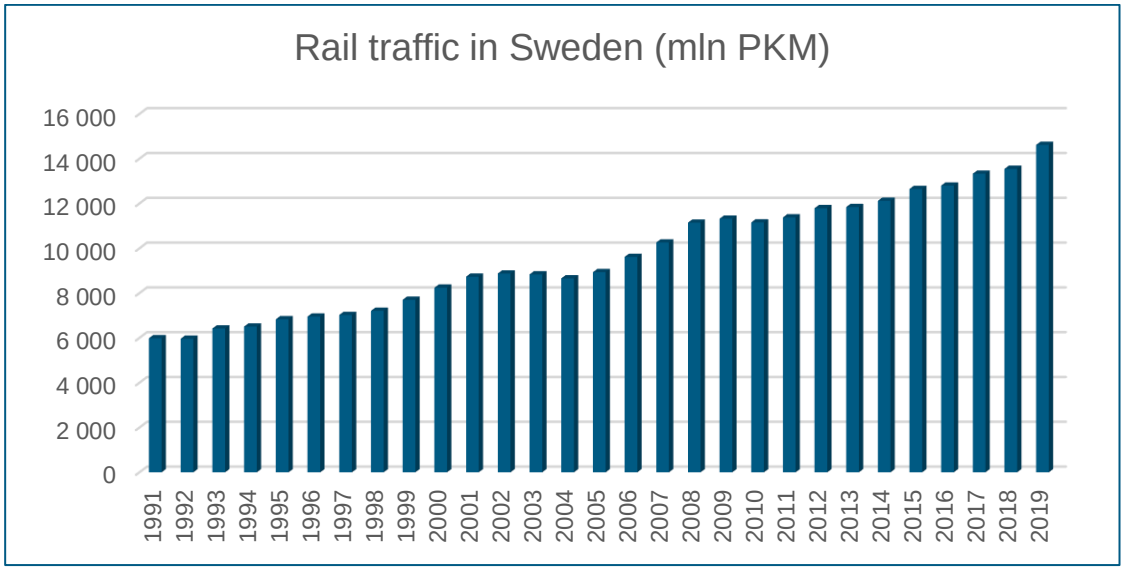
Sweden does not have High-Speed rail infrastructure, but in some parts of the network it is possible to run trains more than 200 kilometres per hour.

Sweden policy is to incentivise the use of the rail by applying low TAC.

Sweden uses the SRMC criteria (Short Run Marginal Cost) to have a higher utilisation of the network and at the same time to increase the competition.

The Network Grants cover the majority of costs of the infrastructure network and the track Access Charge is reduced by this political decision.

Figure 6-28 – Rail traffic in Sweden

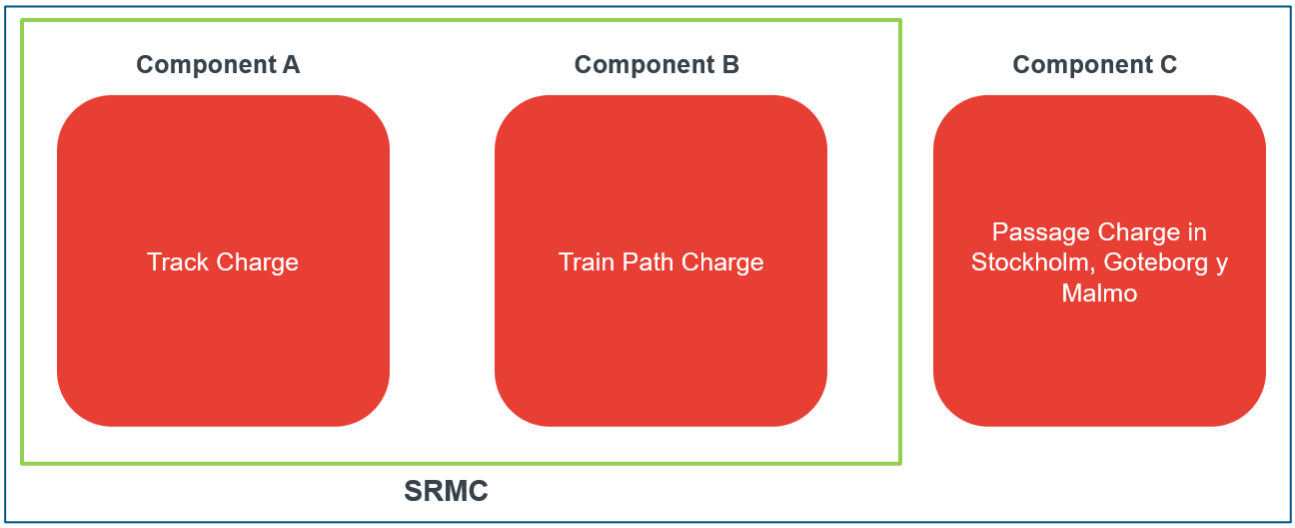


The revenue derived from the TAC is around 5% of the total cost of the IM.

The three components of the MAP in Sweden are:

- Track charge.
- Train path charge.
- The passage charge in Stockholm, Goteborg and Malmo.

Figure 6-29 – Rail traffic in Sweden



The first two component are directly linked to the SRMC while the third component is related to the congestion in the urban nodes.

The TAC considers two variables:

- Axle load.
- Typology of service (passenger or freight).

Table 6-9 – Track Access Charge by axle load and typology of train

Typology	Axle Load	Toll
Freight	≤ 10 tonnes	0.00084 Euros per gross tonne-km
Freight	> 10 tonnes ≤ 17 tonnes	0.00094 Euros per gross tonne-km
Freight	> 17 tonnes ≤ 25 tonnes	0.00104 Euros per gross tonne-km
Freight	> 25 tonnes	0.00104 Euros per gross tonne-km
Passenger	≤ 17 tonnes	0.00152 Euros per gross tonne-km
Passenger	> 17 tonnes	0.00168 Euros per gross tonne-km

The axle load cost is directly linked to the “wear and tear”, and both passenger and freight trains have a differentiation in several categories.

The train path component is dependent on the type of traffic and the level of use of the network.

Trafikverket has fixed the same tariff for the typology of traffic for the use of the slot.

Table 6-10 – Track Access Charge by level of use by typology

Typology	High level of use	Medium level of use	Low level of use
Passenger	0.78 Euros per TKM	0.33 Euros per TKM	0.19 Euros per TKM
Freight	0.78 Euros per TKM	0.33 Euros per TKM	0.19 Euros per TKM
Technical	0.78 Euros per TKM	0.33 Euros per TKM	0.19 Euros per TKM

The passage charge in Stockholm, Goteborg and Malmo was introduced to pay for not only the marginal cost but also for a small part of the markup.

This component is linked to the congestion of the network in Stockholm, Goteborg and Malmo urban nodes and it is due for train running in the nodes from Monday to Friday from 6 to 9 am and 3 and 6 pm.

There is also a passage charge for freight trains in the Oresund link and it is linked to repaying a small part of the construction cost of this infrastructure.

Table 6-11 – Cost by location

Location	Cost
Urban node Stockholm	42.3 Euros
Urban node Goteborg	42.3 Euros
Urban node Malmo	42.3 Euros
Oresund link (freight trains)	293 Euros

The cost for a High-Speed train (second category for the UIC classification) is around 1.8 Euros per train kilometre and it is linked to the Direct Cost of the use of the network. It is worth noting that Sweden uses a Track Deterioration Model that may be worth comparing with any model for Direct Costs that is developed.

A.3.6.1. Management of Externalities in Sweden

This section summarises how Sweden manages “externalities” through the TAC. In the case of Sweden, the most important externality in terms of TAC is the environmental impact of rail - which is favourable compared with road as a mode. In Sweden TAC for freight is reduced to help rail competing with road and compensate for the external cost of road.

Sweden is a good example for environmental policy testing, because it has a competitive rail freight market and a relatively sophisticated approach through the TAC to reflect the different externalities between rail and road.

This approach has been widely copied and have been encouraged by the EU.

Sweden Network Grants State aid (Approval required by DG COMP, which was approved October 2020) for reducing external costs with the following maximum aid intensities: 30% of the total cost of rail transport and up to 50% of the eligible costs.

The external costs calculated by Swedish Transport Administration for the freight sector and approved by European Commission are summarised in the following table.

Table 6-12 – External cost factors: Euros per 1000 Tonne Km

External cost in Sweden for freight sector		
	Road	**Rail**
Accident	1.28	0.15
Noise	1.59	0.68
Emission (excl.CO2)	0.61	0.11
Climate Cost (CO2)	25.18	0.92
Total	10.54	1.86

These values can act as a guide.

The final decision was taken on October 2020 by the European Commission.

The objective of the measure is to strengthen the competitive position of rail and thereby encourage the transfer of freight transport from road to rail by supporting rail as the more environmentally friendly mode of transport.

The eligible costs correspond to the share of external costs that rail transport makes it possible to avoid compared with competing modes of transport.

The Swedish Transport Administration has estimated that the total cost of rail transport in Sweden is EUR 15 per 1 000 tonne-kilometres. Sweden intends to Network Grant State aid for reducing external costs with the following maximum aid intensities: 30% of the total cost of rail transport and up to 50% of the eligible costs.

Comparison of maximum and minimum TAC for freight and passenger

It is possible to summarise different Access Charge for every country, taking in consideration the minimum and the maximum level.

There are 2 segments considered:

Conventional Passenger services.

High-Speed rail services.

Freight services.

- And two level of TAC:

  Minimum.

  Maximum.
- The level for the minimum TAC for passenger services is very different in every country. The analysis takes in consideration the component A (Direct Cost) and the component B (Mark Up) of the TAC.

A.4. Capacity allocation

The following sections provide additional information to section 2.6.4 for the six different nations.

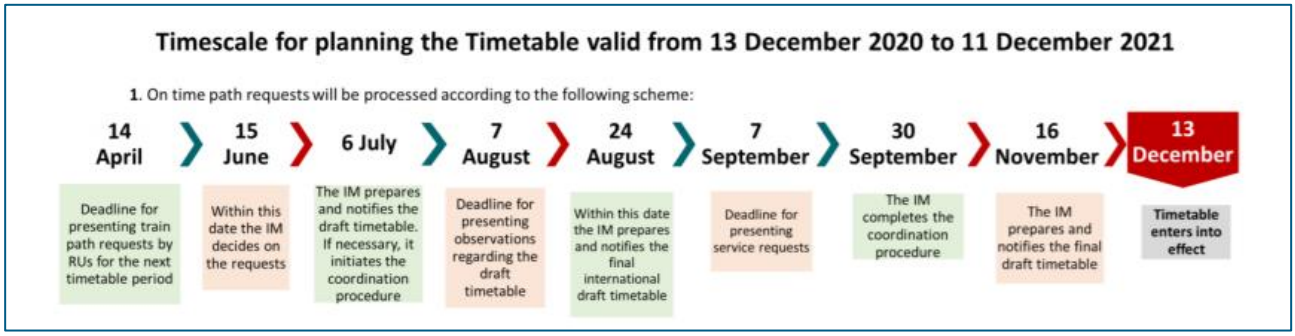
The section below discusses how the Capacity Allocations rules operates in Italy, Germany, the Netherlands, Spain, Belgium and Sweden.

A.4.1. Italy

The capacity that can be allocated under a Framework Agreement, or a set of Framework Agreements, cannot exceed 85% of the total capacity associated with each section and time slot.

The allocation of the train paths and ancillary services requested within at least 8 months prior to the date the timetable comes into force shall be made according to the following schedule described in the following figure:

Figure 6-30 – Italian Timetable planning cycle



In the event of a conflict arising between the Framework Agreements already concluded and new requests, related to the 15% not regulated by the Network Statement, for the conclusion or amendment of a Framework Agreement, the Infrastructure Manager shall perform a first round of coordination aimed at reconciling the requests as far as possible.

Short notice requests for train paths shall be possible only within the framework of a valid contract, subject to consistency with the guidelines stipulated in the Safety Certificate.

They shall be submitted:

- Between 4 calendar days and 6 hours prior to the departure of the train, in the case of “long-distance” paths
- Between 4 calendar days and 3 hours prior to the departure of the train, in the case of “short-distance” paths
- In real time, in the case of emergencies

The Infrastructure Manager shall undertake a coordination procedure in order to reconcile any conflicting requests. In allocating train paths related to requests for a specific timetable slot and/or for intermediate adjustment, the Infrastructure Manager without prejudice to the paths requested in accordance with the Framework Agreement, shall assign priority to (for which they all have the same priority):

- International passenger train services.
- Transport services, the quality and quantity of which is sufficient to meet the mobility needs of the general public, governed by specific service agreements between Railway Undertakings and the central or regional governments.
- High-Speed train services (entirely or partially) using dedicated infrastructures - built anew or upgraded - and to freight transport services carried out on dedicated lines.

Any incompatibility between train paths with equal priority shall be solved by giving priority to the service aimed at the traffic characteristic of the time slot of interest, as follows:

1. Regional services between 6.00-9.00 and 17.00-20.00.
2. High-Speed train using dedicated infrastructures between 7.00-22.00.
3. International freight services or freight services provided on dedicated lines shall be given priority status along the entire route, with respect to the other services referred to in paragraph before in the time slot between 22.00 and 6.00.

A.4.2. Germany

DB Netz AG assigns train paths to accept as many applications for train path allocation as possible, while ensuring the best possible utilisation of the available infrastructure capacity. This is common for most EU IM capacity allocation processes.

The following figure summaries the Timetable planning cycle for the capacity allocation process.

Figure 6-31 – Capacity allocation deadline

Working timetable compilation	Deadline
Train path application deadline first phase of working timetable compilation	14.03.2020 - 14.04.2020
Provisional draft working timetable first phase of working timetable compilation	until 06.07.2020
Reaction of the Applicant or the involved RU to the provisional draft working timetable first phase of working timetable compilation	until 06.08.2020
Final draft working timetable first phase of working timetable compilation	until 13.08.2020*
Working timetable first phase of working timetable compilation	until 20.08.2020*
Train path application deadline second phase of working timetable compilation	15.04.2020 - 30.09.2020
Final draft working timetable second phase of working timetable compilation	until 6.11.2020
Begin working timetable	13.12.2020 at 00:00 h

Insofar as orders are not made for the Point-to-Point market segment for long-distance passenger rail services, or with the addition “Z-Flex” or “R-Flex” for rail freight transport, DB Netz AG attempts to compile a train path offer within the following tolerances:

- Train paths for passenger services: +/-3 minutes,
- Other train paths (e.g., freight trains, traction unit movements): +/-30 minutes.

If the above tolerances are insufficient to resolve the conflict or if this would make it impossible to meet Applicant (as the MTO) or the involved Railway Undertaking requests for connection commitments/ interconnecting paths, the coordination procedure is adopted. In the coordination procedure, DB Netz AG enters negotiations to bring about mutually acceptable solutions, submitting its own suggestions.

These can deviate in time and place from the train path application. The Applicant or the involved Railway Undertaking can contribute own solution proposals that are checked for feasibility by DB Netz AG. If mutually acceptable solutions are reached, such agreement forms the basis for further preparation of the provisional draft working timetable.

If instead the coordination procedure fails to produce a mutually acceptable solution, the dispute settlement procedure is implemented. With the decision to initiate the dispute settlement procedure, DB Netz AG will, upon conclusion of the coordination procedure, ask the Applicants involved to initiate the dispute settlement procedure.

If the coordination procedure fails to produce a mutually acceptable solution, the dispute settlement procedure is implemented pursuant. In the adjudication stage (standard procedure), DB Netz AG arrives at a decision adopting the following order of priority:

- Regular-interval or integrated network services
- Cross-border train paths.
- Train paths for freight traffic.

A service is defined integrated if it refers to rail passenger transport, and:

- at least two connections to other train paths within 30 minutes (reference in the comments field to connections to at least two stops on its own or other train paths) have been ordered,
- or it forms an ordered circuit with outward and return service and an unchanged train configuration; the break between outward and return journey must not exceed 60 minutes. The train configuration according to the preceding sentence remains the same even if in multiple unit trains one or more railcar units are removed or added.

A service is defined integrated if it refers to rail freight transport, and:

- at least two connections (reference in the TPN comments field to connections to at least two stops) have been ordered, in which a group consisting of at least 8 wagons are either removed or connected, or
- it forms an ordered circuit with outward and return service and an unchanged train configuration; the break between outward and return journey must not exceed 480 minutes.

If, in the last two years, a successful applicant has not used at least 70% of the train paths in the completed working timetable period that have been offered allocated by DB Netz AG upon its application, then, in the event of a conflict where the aforementioned order is to be used for a decision, the successful applicant must provide a proof to DB Netz AG that it in fact intends and it is in a position to use the registered train paths.

If, having applied the priority rules mentioned before, a train path application for the working timetable does not have priority in the dispute settlement procedure, DB Netz AG assesses whether a reference exists to a framework agreement (such as one between an IM and a Railway Undertaking) for this train path application. In this case, a non-conflicting train path is sought for this train path application within the margins secured in the framework agreement. If such a path is not available, then the train path featured in the application is allocated to the Applicant holding a framework agreement.

If the use of the priority rules does not clarify prioritization, DB Netz AG shall compare the charges for the disputed train paths, and the application generating the higher charge is Network Granted with train path allocation.

If the standard charge procedure fails to produce a decision, the highest bidder procedure is implemented.

To initiate the highest bidder procedures, DB Netz AG invites the affected Applicants to offer a sum of money within five working days that is higher than the payable charge under the terms of the relevant list of charges for train paths, referring to the entire working timetable period. The bids are to be forwarded to DB Netz AG only through the Federal Network Agency. The train path is then allocated to the bidder willing to pay the highest charge.

Reserve capacities on the rail freight corridors are published two months before the start of the working timetable. These reserve capacities are entered in the form of free capacity per calendar day and corridor section, based on standard journey times and standard parameters. The Reserve Capacity Calendar is made available on the internet and updated regularly.

DB Netz AG detects congested railway lines which can be expected to suffer from insufficient capacity in the near future. Within six months following a declaration of congestion, DB Netz AG carries out a capacity analysis DB Netz AG produces a draft plan for increasing capacity within a further three months, with said plan to be submitted to the Federal Railway Authority and the Federal Network Agency after consultation.

A.4.3. The Netherlands

In the Netherlands the allocated capacity is agreed between the titleholders (the company that request capacity) and ProRail, the Infrastructure Manager.

Three types of processes can be distinguished:

- Preparation phase - for the timetabling process.
- Timetabling process - finalisation.
- Allocation of capacity - in the ad hoc phase.

For international capacity requests, a transport operator must apply for a train number via DB Netze or Infrabel and state this train number in the request.

ProRail will facilitate and manage the joint consultation between titleholders with a view to coordinating their requests.

The following figure summaries the Timetable planning cycle for the capacity allocation process.

Figure 6-32 – Capacity allocation in the Netherlands

Activity	Date
Submitting requests	
a. Donna file open for requests	yet to be determined via the Allocation Table
b. closing date for timetable requests for train paths (national and international) and determination of required capacity for weekly withdrawals	12/04/2021
c. Intake requests	from 13 to 23/04/2021
Scheduling and coordination	
d. Start of scheduling and coordination	13/04/2021
e. RNE Technical Meeting	from 13 to 17/06/2021
Consultation on draft timetable	
f. Draft timetable ready for consultation	05/07/2021
g. closing date consultation reactions	06/08/2021
Determining the capacity allocation	
h. determining the capacity allocation	23/08/2021

ProRail seeks harmonisation with other Infrastructure Managers in Europe during the scheduling and coordination process.

The following general principles apply to the timetabling and ad hoc phase processes and in addition to relevant legislation and regulations (as the regulation 2016/545 and Sections 8 to 13 Railway Capacity Allocation Decree):

- The peak period as referred to in the Railway Capacity Allocation Decree is stated in the allocation process as: from 6.30 to 9.00 hours and from 16.00 to 18.30 hrs.
- When allocating capacity, ProRail does not only consider the physical capacity of the infrastructure, but also assesses whether the request is in line with the prevailing standards, defined in the Network Statement, in the areas of the environment (including noise), bridge openings, rail safety and transfer safety. The outcome of these tests could have implications for both capacity allocation (reduced or subject to conditions) and already acquired capacity rights (instructions given or withdrawn).

In case of competing requests, a coordination procedure starts, subject to the following rules:

1. Scheduling and coordination consultation with the authorised parties for the timetabling process takes place at the Allocation Table in the premise of ProRail.
2. The identified conflicts are communicated to all applicants involved.
3. The applicants involved are invited for further consultation, based on a coordination proposal from ProRail.
4. All applicants involved are invited to submit proposals to solve the conflict.
5. Proposed solutions must fit within the usability of the railway infrastructure, taking into consideration planning standards, local needs and user restrictions such as noise, rail safety and transfer safety.
6. The objective is to find solutions in which the capacity request is Network Granted as much as possible (taking process rule 5 into account), the commercial and operational relationship within the requested capacity is disrupted as little as possible, and the economic consequences of deviations from the requested capacity are as limited as possible. The statutory priority rules need not be applied in seeking solutions.
7. The border-crossing times agreed within the context of RNE (RailNetEurope)[27] are maintained. If a deviation is necessary, a new border time is agreed with the international Infrastructure Manager concerned and offered to the transport operator.
8. The proposals presented by ProRail are compatible with the timetable measures as included in the capacity enhancement plans.
9. The degree in which an applicant has used train paths in preceding years is not taken into account. ProRail may be asked to mediate conflicts but has no means of enforcing the changes required to accept a new request.

The dispute resolution procedure prescribes a meeting whereby the stakeholders will be offered a fair hearing with the objective of resolving the conflict during the coordination process.

[27] RaiNetEurope is an association of European rail infrastructure companies established in 2004 to harmonise conditions in European railway transport.

ProRail will determine the allocation in accordance with applicable laws and regulations[28] and if the priority rules are insufficiently distinctive, the following rules apply, stated in order of priority:

1. 'Transport takes precedence over traffic.' This means that trains intended for the commercial transport of passengers or freight have priority over trains (passengers or freight) that are not commercial transport (for example technical trains).Some specific priorities for some routes. For example, on the route Meteren Aansluiting – Zevenaar Grens (return), freight trains with their final destination or first origin in the area bounded by the stations Emmerich – Voerde – Oberhausen – Bottrop – Gladbeck – Gelsenkirchen – Herne – Duisburg – Rheinhausen take precedence overfreight trains with another origin or destination.
2. The highest possible utilisation (transport/ traffic) is accommodated within given environmental capacity limits (noise and risk)

Capacity bottlenecks can be signalled during the timetabling process or following a forecast of capacity requests for the near future.

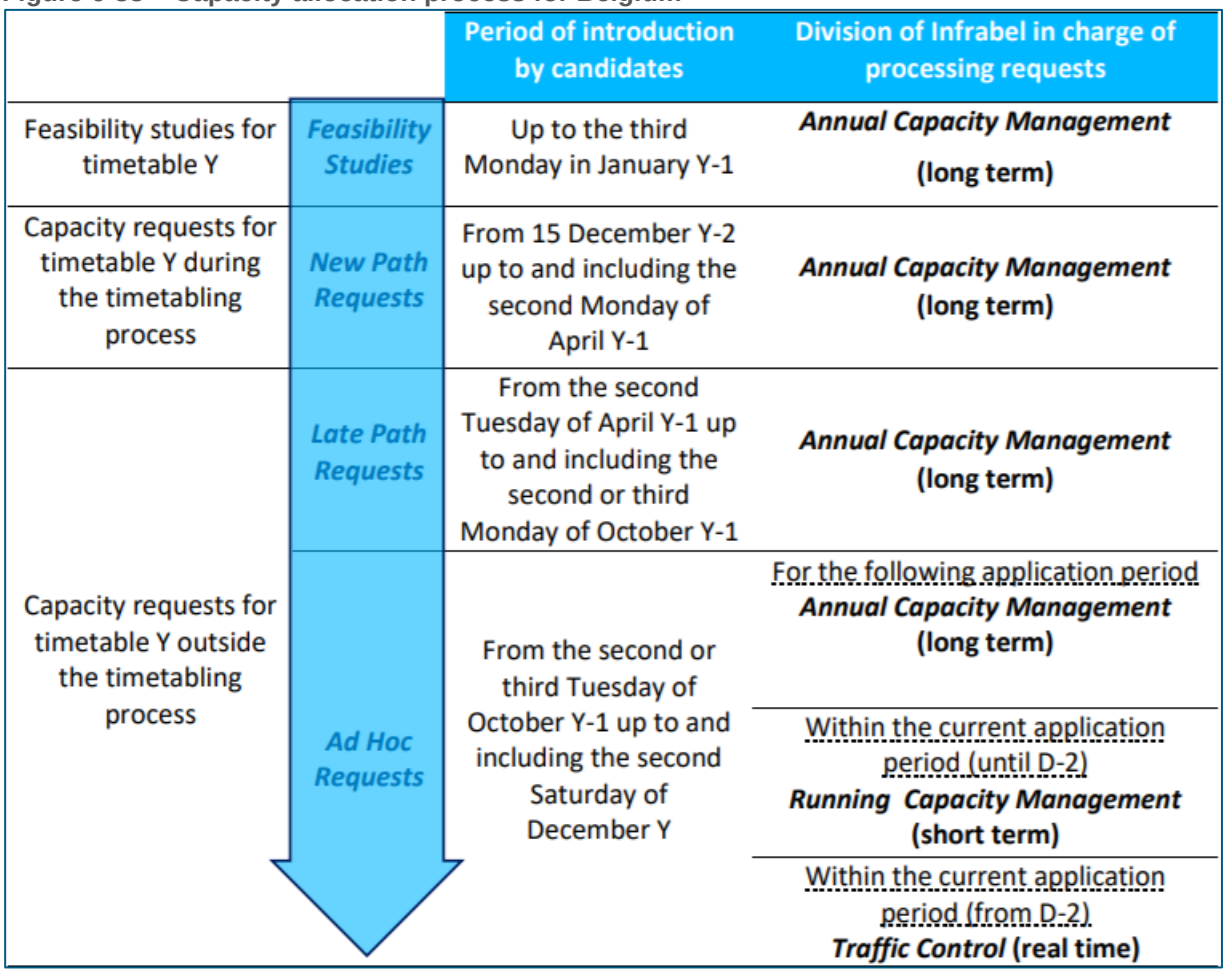
A.4.4. Belgium

The IM, Infrabel is the body states and prescribes how railway infrastructure capacity must be used and is responsible for allocating train paths for that capacity.

The Regulatory Body for Railway Transport and for Brussels Airport Operations ensures that the allocation of railway infrastructure capacity as part of its monitoring tasks.

The figure below summarised the process of capacity allocation request.

Figure 6-33 – Capacity allocation process for Belgium



Any request for a capacity request may relate to one of the following categories:

- Freight trains (including those with exceptional transports).

[28] Sections 8 to 13 Railway Capacity Allocation Decree

- Empty run of freight service.
- Passenger trains (including tourists/leisure services).
- Empty run of passenger service.
- Technical trains other than those requested by Infrabel.

When the Infrastructure Manager receives capacity requests to create an international train path, it confers with the relevant Infrastructure Managers, to offer harmonised capacity, as far as possible.

Infrabel allocates train paths on a section of the infrastructure that is congested, without prejudice to the capacity reserved for planned network maintenance, taking into account the following priorities:

- On the High-Speed lines:

1. High-Speed trains.
2. Rapid passenger trains (Trains that are able to run at the authorised speed and have limited numbers of stop on the schedule).
3. Other trains.

- On lines principally intended for the carriage of goods:

1. Rapid freight trains (more than 100km per hour).
2. Slow freight trains (less than 100 km per hour).
3. Passenger trains.
4. Other trains.

- On lines principally intended for passenger transport:

1. High-Speed trains and rapid passenger trains.
2. Conventional passenger trains.
3. Freight trains.
4. Other trains.

- On the mixed lines:

1. High-Speed trains and rapid passenger trains.
2. Slow passenger trains and rapid freight trains. Interestingly there is no formal definition of rapid freight trains, but this is usually understood to mean freight train capable of keeping time with slow passenger trains.
3. Slow freight trains.
4. Other trains.

Where the application of the priority criteria does not solve conflictual capacity allocation requests, the Infrastructure Manager allocates the train path to the applicant whose train path request produces the higher total level of user charges on the route envisaged. This may be a type of structure that the Baltics wish to avoid because is only seeks to maximise revenue a cost to the economy.

A.4.5. Spain

ADIF is the Spanish Infrastructure Manager and has defined its 10-year network statement for the “network of general interest[29]”, with the purpose of creating three High-Speed packages for the process of liberalisation started at the end of 2020. In general, for the other services, the framework agreement has a maximum period of 5 years.

In Spain, the use of the High-Speed line is exclusive for the High-Speed trains.

There are priorities for the capacity allocation:

1. Exclusive use of the line that is used by a specific service (HSL).
2. Services of general interest.
3. International services.
4. Services with a framework agreement (in some instance, tourist/leisure trains operate without a framework agreement.

The coordination process in Spain aims to find an agreement with different operators requesting capacity allocation for similar slots (+-60 minutes).

[29] Lines are defined by the Spanish regulation 710/2015

If it is not possible to find a solution, ADIF will find the best solution for the rail network taking in consideration that it has to (this is not a prioritisation solution, but rather an attempt to find the most efficient solution):

- Find the best solution for the efficiency of the network.
- Find the alternative similar solutions.
- Use of Specialised traffic for specialised lines(High-Speed rail or commuter).
- Public service obligation services and freight transport.
- Services with framework agreement.

Railway undertakings in the High-Speed rail signed a 10-year network statement agreement and ADIF made a tender for the capacity.

The purpose of ADIF was to open to the competition to new entrants without having an open access scenario as in in Italy.

The process of liberalisation was linked to an increase of the numbers of train services on the HSR network.

The liberalisation process was started by creating three service agreements:

- The first package (type A), assigned to RENFE, was intended for the incumbent, with three trains per hour and direction.
- The second package (type B) assigned to ILSA/Iryo with a proposed frequency of one train per direction and per hour.
- The third package (type C) assigned to Ouigo/SNCF was for low-cost companies, with one train per direction every three hours.

Competition will be carried out on the main lines:

- Madrid – Barcelona – French border.
- Madrid – Valencia / Alicante.
- Madrid – Toledo / Sevilla / Malaga.

The three packages commenced at the end of December 2020, but the competition started a few months later, with the entrance of Ouigo (SNCF railway undertaking) into the market.

The capacity allocated through these three service contracts covers 70% of network capacity, while the remaining 30% is allocated on a yearly basis., under the requests of different High-Speed railway operators.

The process of prioritisation follows the general rules describes before.

Spain has the most developed network for High-Speed rail with more than 3300 kilometres, even though historically the network utilisation has been very low. ADIF decided to create a procedure of tender for the service agreements in order to attract new entrants in the High-Speed services.

Figure 6-34 – High-Speed lines in Spain

A.4.6. Sweden

The process for train path requests and capacity allocation is divided into:

- An allocation process that produces an annual timetable.

The process is divided in two phases: Phase 1 includes applications for capacity for train paths and services received before the last date for application and allocated capacity in the so-called primary timetable. Phase 2 complements the established primary timetable with applications received as additional applications and results in the established annual timetable.

- Process for adjustment of the annual timetable.
- Ad hoc process for updating the established timetable with new capacity requirements.

Some specific corridor's pre-arranged train paths are a reserved for international freight traffic in the annual timetable.

The process mentioned above is used as planning conditions in the capacity allocation process for the purpose of:

- To be able to achieve efficient utilisation of capacity in the area.
- To ensure punctuality by means of robust timetables.

When allocating capacity, the Trafikverket, the Infrastructure Manager will, when necessary, prioritise vehicle circulation with turn-around times shorter than 14 hours. Saturdays, Sundays, and holidays count as zero hours.

The allocation process aims to achieve an annual timetable that provides the railway undertakings with the conditions to deliver high-quality rail services. The timetable must be designed so that there are conditions for maintaining very high punctuality in the entire traffic system.

The following planning criteria are used during the allocation process:

- Time interval between trains.
- Simulation of driveability.
- Capacity restrictions.
- Capacity plans.

- Pre-arranged train paths for freight trains for Scandinavian Mediterranean Rail Freight Corridor.

The aim of the coordination process is to harmonise the needs of the applicants for capacity and services, in order to produce a primary timetable without conflicts of interest.

Whenever the coordination of the applications for capacity allocation fails, Trafikverket will create the primary timetable by allocating capacity in accordance with the priority criteria.

Priorities are defined in the annex of the regulation of Trafikverket. In many cases there is more than one set of conditions which lead to the same priority category.

The basic principle of Trafikverket priority criteria is to choose the solution to a conflict between applicants that provides the greatest socio-economic benefit.

The priority criteria do not provide a specific priority between trains. No train is prioritised in favour of another. The priority criteria point out the solution that will be recommended with the help of a calculation model. The model is based on a number of simplifications and standards. For all applied train paths, a relevant priority category must be specified.

The calculation model provides answers as to which solution delivers the lowest cost and which should therefore be recommended.

There are priority categories for train path of freight rail and for passenger rail and Trafikverket show the cost parameters used for categorised trains when calculating the socio-economic cost in the model.

In order to settle a conflict of interests, the conflict resolution option which according to the described calculation model provides the lowest cost will be chosen in front of all other options which provides a higher cost.

Capacity is evaluated in the form of:

- Allocated train paths, both national and international.
- Capacity reserved for engineering works.
- Reserved capacity for ad hoc applications for train paths and services, both national and international.
- Reserved capacity for engineering works that cannot be booked in the allocation process - reserve capacity for transportation of work vehicles.
- Remaining capacity.

In general, the coordination between countries is a key element for the traffic on the European rail freight corridors (RFC2). The RFCs has the aim to harmonise the international railway business core processes used by Infrastructure Managers (IMs) and Allocation Bodies (ABs).
The international coordination process has objective to generate benefits on the main corridors carrying international rail traffic.

7. Appendix B, Analysis of Scope and Contracting parties

	Manufacture, supply and commissioning of trains	Use of the trains by a RU	Train design authority	The supply of consumables and spares parts	Light maintenance	Heavy maintenance	Development, construction and commissioning of a depot	Use of the depot by a train maintainer	Depot building and equipment maintenance	Train maintenance planning and operational control of the depot
Rail Baltica (RB Rail AS)	Not able to provide scope	Able to own trains and lease or otherwise provide them to a RU.	Not able to provide service	Not able to provide service	Not able to provide service	Not able to provide service	Could develop and contract the construction	Able to own and lease, or otherwise make available to a maintainer	Could only provide service using a contractor	Not able to provide service
A Railway Undertaking (A train operating company)	Not able to provide scope	Theoretically able to own their own trains, though franchise duration and balance sheet strength may prevent it	May be able to provide service	Could only provide service using a contractor	All RUs are capable of providing this service	Most RUs are capable of providing this service, and all can do it using contractors	All RUs should be able to undertake this work, though would contract out construction	Theoretically able to own and lease a depot, or otherwise make available to a maintainer, though franchise duration and balance sheet strength may prevent it	All RUs are capable of providing this service	All RUs are capable of providing this service

A train manufacturer	Core business activity	Could offer this service but would require finance support or be part of a consortium	Core business activity	Core business activity	Able to provide this service either through a service division or contracted out	Able to provide this service either through a service division or contracted out	Could develop and contract the construction	Able to own and make available to maintainer, though duration of assured use could be an issue	Able to provide this service, though interface risks exist if they are not the maintainer	Able to provide this service though close interface management required with the RU
A train maintainer	Only able to provide this service if a division of a manufacturer	Would not be able to own trains if a stand alone business, could be part of an owning consortium	Not able to provide service	Core business activity	Core business activity	Core business activity	Could develop and contract the construction	Able to own, though duration of assured use could be an issue	Able to provide this service, though probably only practical if they are the maintainer	Able to provide this service though close interface management required with the RU
A train owner	Could act as procuring agent for trains	Core business activity	Not able to provide service	Not able to provide service	Could contract out this service	Could contract out this service	Could develop and contract the construction	Able to own and lease, or otherwise make available to a maintainer, though risk profile would different to the trains and hence be unattractive	Could only provide service using a contractor	Not able to provide service

A parts supplier	Only able to provide this service if a division of a manufacturer	Not able to provide service	Not able to provide service	Core business activity	Only able to provide this service if a division of a train maintainer	Only able to provide this service if a division of a train maintainer	Not able to provide service	Not able to provide service	Not able to provide service	Not able to provide service
A depot developer	Not able to provide service	Not able to provide service	Not able to provide service	Not able to provide service	Not able to provide service	Not able to provide service	Core business activity	Could offer this service but would require finance support or be part of a consortium	Could provide ongoing facility management	Not able to provide service
A depot owner	Not able to provide service	Not able to provide service	Not able to provide service	Not able to provide service	Not able to provide service	Not able to provide service	Could develop and contract the construction	Core business activity	Could provide ongoing facility management	Not able to provide service
A depot facility manager	Not able to provide service	Not able to provide service	Not able to provide service	Not able to provide service	Not able to provide service	Not able to provide service	Could develop and contract the construction	Could offer this service but would require finance support or be part of a consortium	Core business activity	Not able to provide service
A consortium or joint venture formed by some or all of the above	Possible to provide this service	Likely to be a core business activity	Possible to provide this service	Possible to provide this service	Likely to be a core business activity	Likely to be a core business activity	Likely to be a core business activity, though may be a separate consortium to the train provider	Likely to be a core business activity, though may be a separate consortium to the train provider	Likely to be a core business activity, though may be a separate consortium to the train provider	Possible to provide this service

8. Appendix C, Analysis of Risk Allocation and Contracting parties

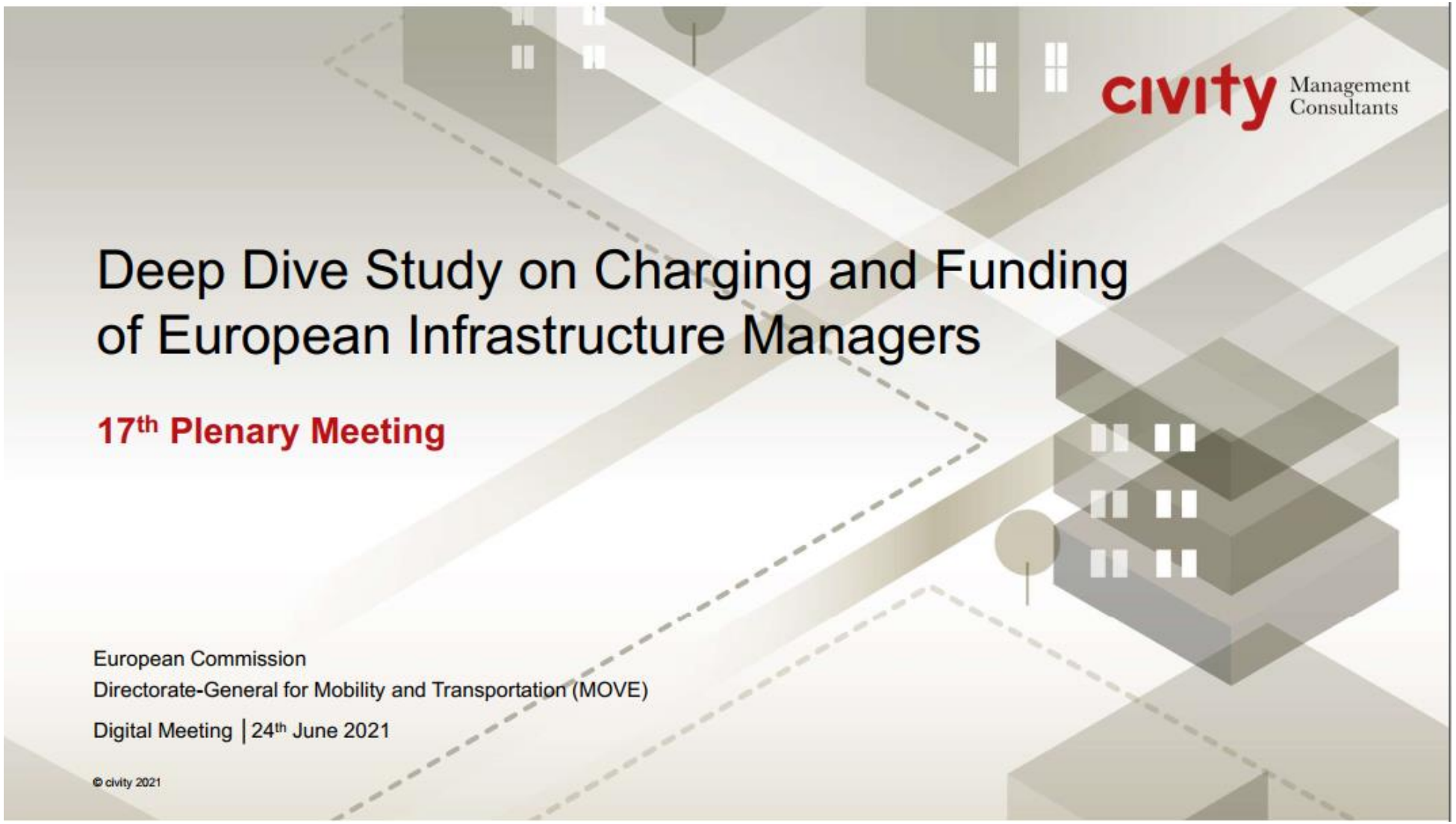
	Train design, development and approvals Risk	**Train delivery and acceptance risk**	**Train availability risk**	**Train reliability risk**	**Train asset condition risk**	**Train residual Value risk**	**Depot development and construction risk**	**Depot availability risk**	**Depot asset condition risk**	**Depot residual value risk**	**Maintenance scheduling risk**
Rail Baltica (RB Rail AS)	Not able to take risk	Not able to take risk	Able to take initial availability risk in terms of buying the right number of trains	Depending on contractual arrangements may have this risk though unable to manage it	Depending on contractual arrangements may have this risk though unable to manage it	Depending on contractual arrangements may have this risk though unable to manage it	May be necessary to take development risk, though construction risk would be contracted out	Depending on contractual arrangements may have this risk though unable to manage it	Depending on contractual arrangements may have this risk though unable to manage it	Depending on contractual arrangements may have this risk though unable to manage it	Not able to take this risk
A Railway Undertaking (RU) (A train operating company)	Not able to take risk	Not able to take risk	Able to take initial availability risk in terms of buying the right number of trains	Able to take this risk if they are the train maintainer	Able to take this risk if they are the train owner	Able to take this risk if they are the train owner	Able to take development risk, though construction risk would be contracted out	Able to take this risk if they are depot facility manager	Able to take this risk if depot owner	Able to take this risk if depot owner	Fully able to take this risk

A train manufacturer	Fully able to take this risk	Fully able to take this risk	Able to take initial availability risk in terms of defining the right number of trains to be built. Could accept ongoing availability risk if acting as maintainer	Able to take this risk if they are the train maintainer	Able to take this risk if part of an owning consortium	Able to take this risk if part of an owning consortium	Able to take development risk, though construction risk would be contracted out	Able to take this risk if they are depot facility manager	Able to take this risk if part of depot owning consortium	Able to take this risk if part of depot owning consortium	Able to take this risk if they are the train maintainer
A train maintainer	Not able to take risk	Not able to take risk	Able to accept ongoing availability risk, though balance sheet strength may limit the ability to enforce risk transfer	Able to accept this risk, though balance sheet strength may limit the ability to enforce risk transfer	Able to take this risk if part of an owning consortium	Able to take this risk if part of an owning consortium	Able to take development risk, though construction risk would be contracted out	Able to take this risk if they are depot facility manager	Able to take this risk if part of depot owning consortium	Able to take this risk if part of depot owning consortium	Fully able to take this risk
A train owner	May be necessary to take this risk depending on train supply contractual arrangements	May be necessary to take this risk depending on train supply contractual arrangements	May be necessary to take this risk depending on train supply and maintenance contractual arrangements	May be necessary to take this risk depending on train supply and maintenance contractual arrangements	Fully able to take this risk	Fully able to take this risk	Able to take this risk, though risk profile would different to the trains and hence be unattractive	Able to take this risk, though risk profile would different to the trains and hence be unattractive	Able to take this risk, though risk profile would different to the trains and hence be unattractive	Able to take this risk, though risk profile would different to the trains and hence be unattractive	Not able to take this risk

A parts supplier	Not able to take risk	Not able to take risk	Only able to take risk as a division of train maintainer and/or manufacturer	Only able to take risk as a division of train maintainer and/or manufacturer	Not able to take this risk	Not able to take this risk	Not able to take this risk	Not able to take this risk	Not able to take this risk	Not able to take this risk	Not able to take this risk
A depot developer	Not able to take risk	Not able to take risk	Not able to take risk	Not able to take risk	Not able to take risk	Not able to take risk	Fully able to take this risk	Only able to take this risk if depot owner	Only able to take this risk if depot owner	Only able to take this risk if depot owner	Not able to take this risk
A depot owner	Not able to take risk	Not able to take risk	Not able to take risk	Not able to take risk	Not able to take risk	Not able to take risk	Able to take this risk but would contract out construction	Fully able to take this risk	Fully able to take this risk	Fully able to take this risk	Not able to take this risk
A depot facility manager	Not able to take risk	Not able to take risk	Not able to take risk	Not able to take risk	Not able to take risk	Not able to take risk	Able to take this risk if also the depot builder or owner	Only able to take this risk if depot owner	Only able to take this risk if depot owner	Only able to take this risk if depot owner	Not able to take this risk
A consortium or joint venture formed by some or all of the above	Fully able to take this risk	Fully able to take this risk	Fully able to take this risk	Fully able to take this risk	Fully able to take this risk	Fully able to take this risk	Fully able to take this risk, though may be different consortium to train owner	Fully able to take this risk, though may be different consortium to train owner	Fully able to take this risk, though may be different consortium to train owner	Fully able to take this risk, though may be different consortium to train owner	Fully able to take this risk

9. Appendix D, Deep Dive Study on Charging and Funding of European Infrastructure Managers (Civity Management Consultants, 24th June 2021)

This study has been added as an appendix to this report following stakeholder feedback. We would like to thank LTGI for directing us to this study. Information contained within this study provides useful additional information to that contained in this report.


civity Management Consultants
Deep Dive Study on Charging and Funding of European Infrastructure Managers
17th Plenary Meeting
European Commission
Directorate-General for Mobility and Transportation (MOVE)
Digital Meeting | 24th June 2021
© civity 2021

Study Participants

25 PRIME members from 22 countries have participated in the charging part of the deep dive study on charging and funding

Participating PRIME members Non participating PRIME members

Note: There are some countries with more than 1 PRIME member where not every member participated, e.g. Denmark (Øresundsbro Konsortiet), Hungary (VPE) and Latvia (LatRailNet).

civity Management Consultants

Scope and definitions

Part 1 of the Deep dive study on charging and funding of European IM is focused on the charging framework which is set by the directive and applied by the IM

Track access charges (TAC) in scope of the Deep Dive Study Charging

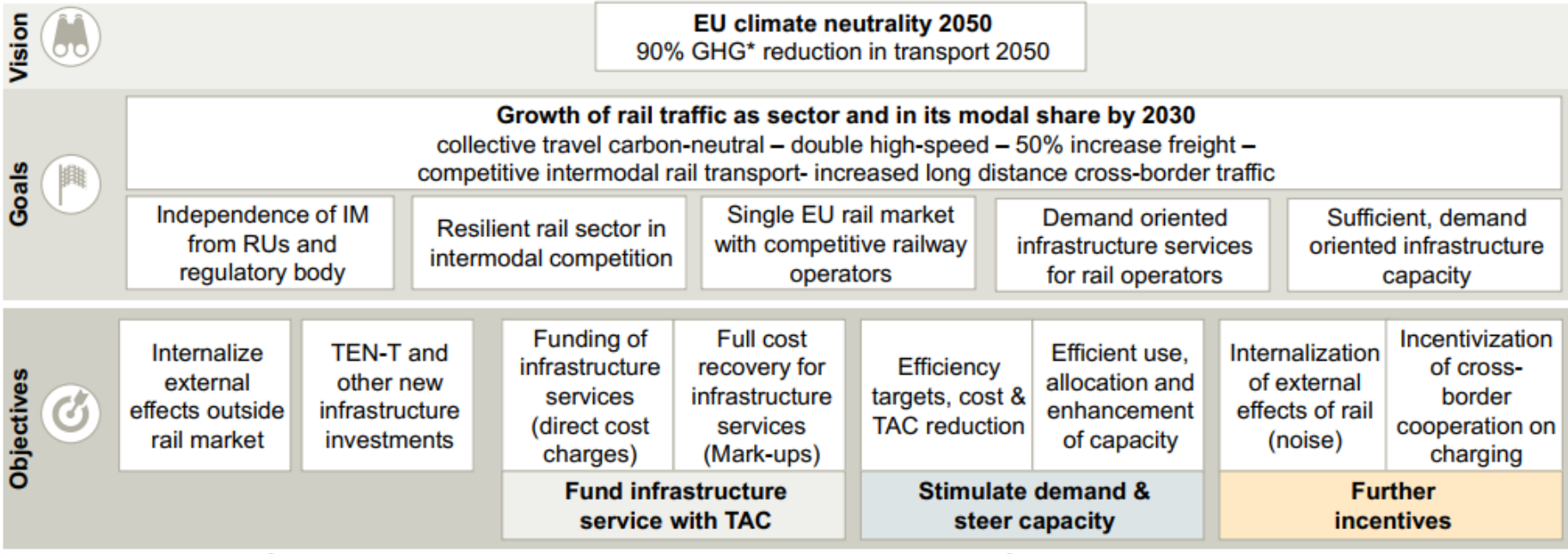
		Short description	Reference (Directive)
Charges for:	Reservation charges	May be levied for capacity allocated but not used	Art. 36
	Performance charges	Penalties, compensations and bonus payments	Art. 35
	Noise component	The cost of noise may be included in the MAP charge	Art. 31 (5)
	Scarcity component	The scarcity of capacity may be included in the MAP charge	Art. 31 (4), 47, 50, 51
MAP TAC	**Mark-ups**	May be levied if they don't exclude the affected market segment from operating the service	Art. 32 (1)
	Direct Cost TAC	To be charged for the use of the railway infrastructure (Minimum Access Package)	Art. 31 (3), Annex II 1.

civity Management Consultants

EU-Goals and Directive 2012/34/EU

EU visions and goals for the rail industry set the target framework for the directive and serve as a guideline of the study's analysis of the charging system

Interaction of EU climate goals and EU rail legislation directive 2012/34



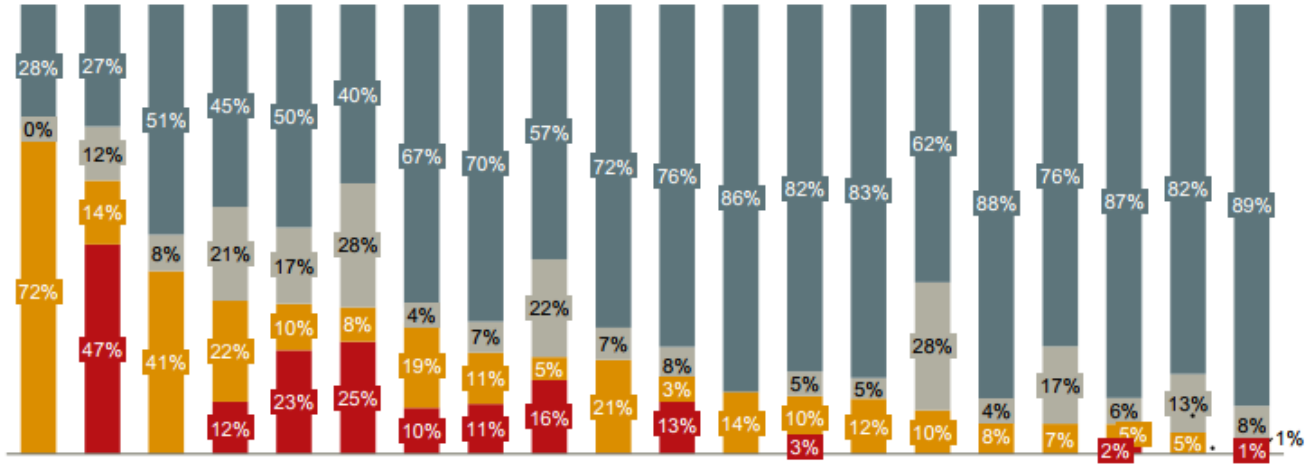
* GHG Greenhouse gas

civity Management Consultants

Funding infrastructure

Mark-ups are implemented by most IM and are important to contribute to higher cost coverage for some IM

Structure of charges incl. mark-ups and funds 2019



	LV	EE-TR	BE	ES	FR-SNCF	HU-MAV	CH	IE	HU-GySEV	PT	IT	NL	AT	DK	SK	FI	CZ	SE	HR	NO
Mark-ups	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓		✓
seg-ments	12	11		7	3	10	3	2	10	8	28	3	6					3		6

Funding | Other | TAC (without mark-ups) | Mark-ups on total income on total funding

Some IM without data (e.g. LV and BE as mark-ups were introduced later in 2019 and 2020, respectively). Market segments include subsegments.

Key topics

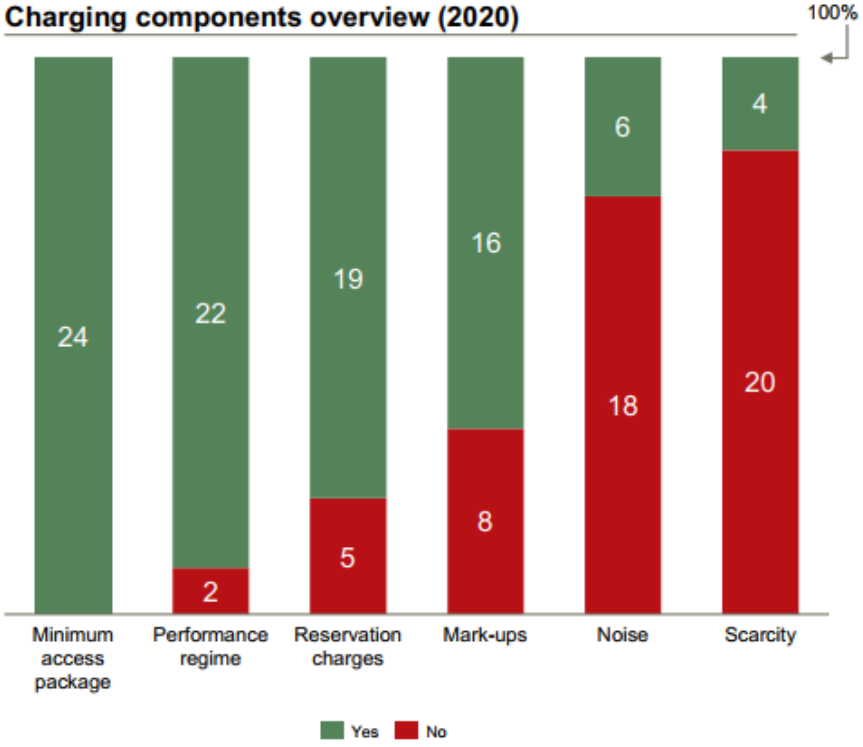
- Relevance of TAC and Mark-ups
- Stability of the share of TAC funding
- Application of mark-ups
- Future development
  - Calculation of TAC
  - Expansion of mark-ups

civity Management Consultants

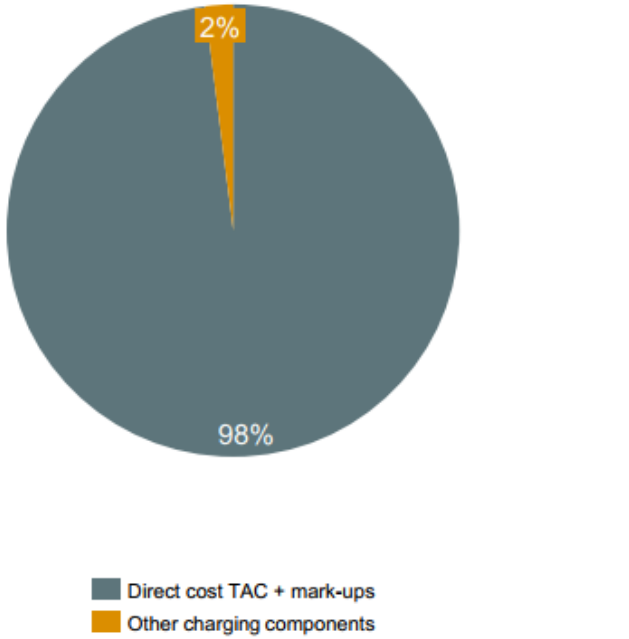
Implementation of track access charges

Most IM apply performance and reservation charges while noise and scarcity related charges are only levied by a small number of IM

Charging components overview (2020)



Share of charging components (2019)

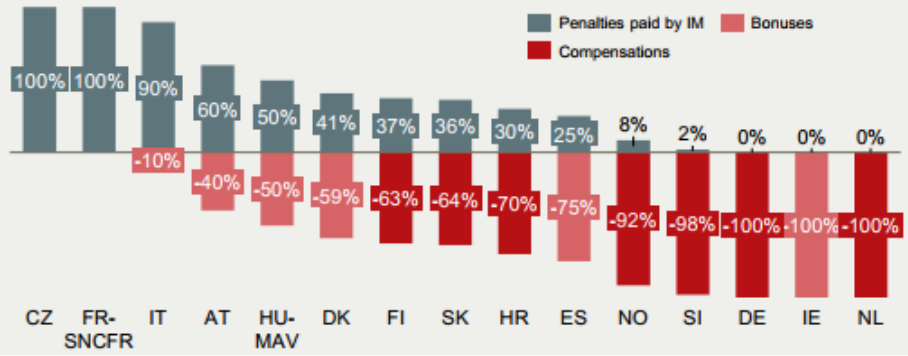


civity Management Consultants

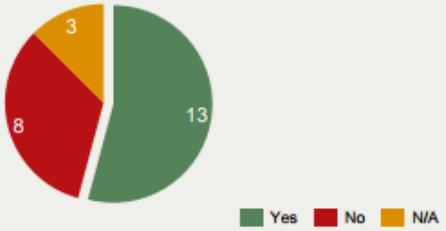
Steering capacity

Almost all IM use reservation and performance charges, scarcity charges are only used by few

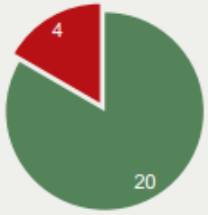
Payment flows under performance scheme (2019)



Number of IM that have a problem with capacity reserved but not used



Number of IMs that levy reservation charges



Key topics

Performance schemes

- Approaches
- Measurement and effectiveness
- Cross-border services

Scarcity charges

- Application and feedback
- Alternative options

civity Management Consultants

Supporting cross-border traffic

For most IM, cross-border traffic does not seem to get high attention from IM apart from rail freight corridors

No specific focus for IM

- Cross-border traffic was rarely mentioned in answers by IM in the studies` questionnaire
- Lack of institutionalized cooperation. IM mostly exchange in rather informal meetings like PRIME and RNE
- Formal cooperation only takes place for rail freight corridors

Transaction costs

- Different charging schemes increase transaction costs for RU
  - When crossing borders, national network statements (NS) and operational and procedural rules must be taken into account, including charges and different path application processes

Mark-ups

- Elasticity not different from long-distance market, elasticity also depends on distance but not on crossing borders
- Not one market (local cross-border traffic, long distance traffic, traffic between metropolitan areas, …)
- DB, for example, uses frequency of trains at borders as a proxy for international traffic elasticities that can bear a mark-up

Direct costs

- Cross-border trains do not cause different direct costs just because they are international
- Usually the same direct cost parameters (heaviness, speed etc.) are to be taken into account as with national traffic

civity Management Consultants


civity Management Consultants
Make tomorrow today
© civity 2021

10. Appendix E, Comments received on report

No.	Chapter	Page	Author	Comment date	Comment	Answer	Responsible person	Date	Implemented/not implemented
1	2.6.1.	23 (Figure 2-4)	EDZL	01.04.2022.	Please make correct link for the figure to particular report. Please note that this is outdated benchmark - 4 years old, that doesn't show also trends of covid-19 influence on TAC.	Link has been updated. This is based on the Independent Regulators' Group report published in 2020, which uses data until 2018 only.	Atkins	26.04.2022	26.04.2022
2	Figure 2.2.4	51	EDZL	01.04.2022.	Is more up to date data available? 6 years old data	Not published and verified.	Atkins	26.04.2022	26.04.2022
3	3.3.	81	EDZL	01.04.2022.	Recommendations for freight TAC should be moved to TAC part	Updated, recommendations moved to section 5	Atkins	26.04.2022	26.04.2022
4	A.2.1. Comparison of TAC across Europe	120	EDZL	01.04.2022.	It is so incorrect to refer to outdated data and trends, given that the pandemic has been around for 2 years, which has had a significant impact on freight transport, not to mention the conditions of war.	There is a lack of transparency over Track Access Charging and data from the Independent Regulators' group was last published in 2020, and only covers up to 2018.	Atkins	26.04.2022	26.04.2022
5	2.6.	23	EDZL	5.04.2022.	This is not benchmarking analysis, but review of IRG findings. We have seen this report, so there is no new information. It would have been useful if there would be study from Network statements, analysing different TAC elements in EU countries that could serve as benchmark, comparing also formulas used.	A study of network statements in the way described was beyond the scope and budget and programme agreed for this study. Formulas for comparison countries are included in the report. E.g. Section A3.1.	Atkins	26.04.2022	26.04.2022
6	Three freight case studies (Example)	13	EDZL	4.04.2022.	What is the essence to put these examples if there is no reference of proven track, no name of the companies? This information cannot be traced or tested if there is interest to take a deeper look on these particular cases.	These examples were illustrative only to add colour to the narrative. The first refers to Roche, the second is confidential, the third created a firm called Mendip Rail.	Atkins	26.04.2022	26.04.2022

7	Table 2.1., 2.2.	10	EDZL	4.04.2022.	If there has been case study analysis this study has to be looked up via TAC elements. In table 2.1. and Table 2.2. is no visualization regarding the countries in which ones these particular TAC elements are used from the market analysis perspective. Again - theoretical approach, not practical. We are more interested in analysis of these TAC elements and how they are calculated in different countries (MAP + additional elements), best practices etc., that could serve as take away for RBGP	Detail on the individual countries is included later in the report. Detail on the individual elements is also included later in the report. The remit for the report required a exposition of EU legislation and some other theoretical matters, which are included. More practical detail on charging can be found in the appendices (including national comparisons). It is important to note that this report was commissioned under Rail Baltica professional services framework, which includes a maximum fee that had also to cover concession letting and procurement of rolling stock as separate subjects, to the same level of detail as TAC.	Atkins	26.04.2022	26.04.2022

8	Chapter 2 (general)		EDZL	30.3.2022.	In many places text is used on the wrong presumption that regulatory body shall accept TACs. Indeed, this is contradictory to the requirements of the Directive 2012/34, Article 29(1) where is stated "The infrastructure manager shall determine and collect the charge for the use of infrastructure in accordance with the established charging framework and charging rules". In turn, Article 55 requires the regulatory be independent in particular from the infrastructure manager, therefore it cannot fulfil the functions of the IM. In its reasoned opinion of the infringement procedure in 2008 the Commission stated concerning the regulatory body in Latvia " a body entrusted with the function of determining infrastructure charges, it determines the overall amount of charges for a particular use of infrastructure, despite the fact that it does not charge a fee from each user (see above). It is part of the main function of infrastructure charges and should be monitored by an independent regulatory body. Under the railway directives, the regulator must monitor the operation of the infrastructure manager, for example, as far as the allocation of tracks and the fixing of fees is concerned. In the case of Latvia, the regulator should monitor its own activities and it does not meet the objectives of the Directives" In the result of such statement major amendments were done in the Railway Law and a charging/allocating body "LatRailNet" have been established.	TAC charges are subject to regulatory approval and are therefore "determined" ultimately by the regulator, who should be independent.	Atkins	26.04.2022	26.04.2022

9	2.3.1.	11	EDZL	30.3.2022.	In particular to previous quoting the Directive the words in the p.8. "(regulatory authorities)", not presented in the Directive text have been included, thus changing the meaning of the text.	Text has been updated to reflect the exact wording of the EU Directive.	Atkins	26.04.2022	26.04.2022

10	2.3.1.	11	EDZL	30.3.2022.	P.8. Affordability to pay is not attributed to the particular railway undertaking, but the relevant market segment, where several railway undertakings may be presented. Addressing the particular railway undertaking is contrary the principles of impartiality and non-discrimination.	Agreed. However Railway Market Segmentation is not simple, the pricing that might be affordable by one customer in a market segment, might not be affordable by another customer in the same market segment. Freight Mark Ups are seem simple to implement where the market is static, but markets move and change geographically and in terms of their sector categorisation. A customer might move the same product by bulk wagons or by containers. It is not simple to have a price for product in containers that is both compatible with the product market segmentation and the container market segmentation. This historic trend across Europe has been for Railway Freight Undertakings to seek to premium price heavy industry, where the opportunity for change are less, but that approach does not work well with the intermodal sector which is likely to form the backbone of Rail Baltica's forecast traffic. It is for this reason, the risk of having a discriminatory pricing policy, and in order to maximise freight volumes, that the report recommends that freight TAC is as close as possible to direct costs only. Such a policy has the advantage of being transparent and non discriminatory.	Atkins	26.04.2022	26.04.2022
11	2.3.2.	14	EDZL	30.3.2022.	There is no such "electrification charge" in the EU legislation, the directive 2012/34 clearly make distinction between “use of electrical supply equipment for traction current, where available", which is part of the minimum access package and "traction current, charges for which shall be shown on the invoices separately from charges for using the electrical supply equipment, without prejudice to the application of Directive 2009/72/EC", which is part of additional services (Annex II of the Directive)	Agreed the language was unclear in the report and has now been changed.	Atkins	26.04.2022	26.04.2022

12	2.3.4.	15	EDZL	30.3.2022.	Verkehrsverbund model was proposed for the PSO topic and it is not in relation with TACs.	The report states that the Verkehrsverbund has no influence on TAC. Verkehrsverbund are regional tariff systems and not included in the commentary on PSOs because they do not relate to the commissions process directly.	Atkins	26.04.2022	26.04.2022
13	3.2.2., fig. 3.2.	75	EDZL	31.03.2022.	The services from Parnu to Riga shall be extended till Jaunmārupe, the overlapping between Riga Central and Jaunmārupe is necessary to provide necessary frequency in connection with Riga Airport. Tis is reflected in the Operation Plan.	Figure 3.2 taken from the operational plan that was made available. Any extension to Jaunmārupe does not change the categorisation of this service, as it is already marked as a regional cross border service. A footnote that this is potentially being amended has been added to the report.	Atkins	26.04.2022	26.04.2022
14	2.1.	8.9	EDZL	4.01.2022.	2.1. section is more general of simple theoretical information about TAC that was not the aim of this study. This has to be more in depth connecting TAC with Rail Baltica project. Theory is publicly available and we are aware of it. We were expecting more useful analysis on Atkins side regarding TAC elements, including offers of TAC calculation.	More detailed analysis is included after page 8, but that depth of analysis is commensurate with the limited budget, programme and defined scope. For example TAC calculations are shown for benchmark nations, e.g. Italy in section A3.1.	Atkins	26.04.2022	26.04.2022
15	2.3.3.	14	EDZL	01.04.2022.	If Atkins weren't able to get the PRIME report, there is no reason to make separate chapter 2.3.3. for purpose of the report if there is no information available	This section has been added to show that this was looked at, and to avoid future comments asking for the PRIME report to be analysed.	Atkins	26.04.2022	26.04.2022
16	2.6.	25	EDZL	01.04.2022.	Please make correct link to the Figure 2-6 (exact link to the report)	Link has been updated.	Atkins	26.04.2022	26.04.2022
17	2.8.1.3. RailNetEurope	35	EDZL	01.04.2022.	Which of the IT tools Atkins suggest to use in RBGP?	We have not provided a recommendation of IT tools to use as this was not part of the remit. The aim of this section is to provide information as to the IT tools used on this corridor.	Atkins	26.04.2022	26.04.2022
18	2.9.	39	EDZL	01.04.2022.	What is the justification of countries used for the benchmarking? During the presentation we asked to benchmark countries that could be beneficial for RBGP, for example Poland.	The countries used in the benchmarking exercise were agreed at project inception, and we have chosen these countries due to availability of data and to provide a reasonable spread of different types of scenarios.	Atkins	26.04.2022	26.04.2022
19	2.6.	General comment	EDZL	01.04.2022.	Please add also countries that are analyzed in this chapter if possible (Fig. 2-4, 2-5)	This is based on 24 EU countries, excluding (Estonia, Ireland, Kosovo, Republic of North Macedonia, Serbia, Sweden and Switzerland. Note added to report.	Atkins	26.04.2022	26.04.2022

20	2.2.1 Assumption of this report	9	LTGI	04/04/2022	TAC is not determined by the Regulator. TAC is determined by the Infrastructure Manager/Charging Body based on the legal charging framework	The final determination of TAC is by the regulator or otherwise TAC does not have regulatory approval, this is explained in more detail in section 2.2.1, and is explained in more detail in the section that covers EU legislation. TAC may be calculated by IM bodies, but the use of the term formally determined refers to legal sign off rather than calculation.	Atkins	26.04.2022	26.04.2022

21	2.2.1 Assumption of this report	9	LTGI	04/04/2022	The report notes that Rail Baltica infrastructure management is a topic that is not formally resolved, which leaves certain ambiguities for the assessment. However, the Rail Baltica infrastructure management model concept is defined and agreed, and is currently under implementation (please refer to the Annual Report for more information: https://rbestonia.ee/wp-content/uploads/2021/12/Annex_Annual-Progress-Report-No-1-2021-1.pdf). The defined model assumes that there will be 3 Infrastructure Managers, but with common approach to infrastructure management functions (charging, capacity allocation, traffic management, etc.). Therefore, the report would be of much greater added value and would provide more valuable assessments it if would at least consider this concept as a potential assumption (particularly regarding potentially different levels of Direct Cost that would not need to be balanced out or somehow unified to achieve the recommended consistent TAC)	Wording has been amended to reference the Rail Baltica Infrastructure Model Implementation annual progress report, which was published several months after this commission and after the initial draft report. This report is carefully neutral on whether there will be 3 or 1 IM. We have taken into account the contents of the Rail Baltica Infrastructure Model Implementation annual progress report number 1, for the period Jan to Dec 2021 (no issue date, but assumed early 2022). We note that significant progress made towards 12 common principles, including common charging principles, which will be required for there to be more than one IM to manage the way in which they co-operate. It is important that the detail of these principles are resolved if the benefits of co-operation are to be fully realised. The document states that there is a "main goal of having a common charging set up to entire Rail Baltica railway line". The three bullet points following confirm the exposition of EU TAC legislation set out in this report. There is nothing in this report in terms of content that conflicts with the assumption that a common Track Access Charging regime will be established, or capacity allocation will not be managed with a common mechanism, along with traffic management. The annual report does not state that there will be three IMs, but sets out how three IMs might co-operate if so constituted, the annual report has been written on the working assumption that there will be three IMs subject to final agreement on all of the 12 aspects of co-operation, however that does not conflict with the analysis of conclusions within this report, and they applies equally whether there is one IM or 3 IMs.	Atkins	26.04.2022	26.04.2022

22	2.2.1 Assumption of this report	9	LTGI	04/04/2022	Chapter refers to Network Grant and Admissible Costs which are explained in more detail under chapter 2.4.2. However, chapter 2.4.2 is irrelevant in this context and is speaking about rules of prioritisation	On page 9 there is no reference to chapter 2.4.2. Search for phrase "Network Grant and Admissible Costs" brough up no results in report.	Atkins	26.04.2022	26.04.2022

23	2.2.2. Coordination of TAC	10	LTGI	04/04/2022	It is being noted that the report and the assessment are based on the assumption that the TAC is coordinated and not influenced by national legislation, and that there is no assumption of how this will be achieved. These statements and scope of assessment significantly limit the added-value and makes the overall feasibility of the policy recommendations that are made in the report questionable. Firstly, TAC is a regulated field and will always be impacted by legislation. TAC in itself is only an output, the actual basis for TAC is firstly the legislation and policy, then the internal methodologies and standard operating procedures of the IM, only based on which the actual TAC levels are then calculated. Therefore, the assumption that TAC will not be impacted by legislation is unrealistic. Secondly, the scope of the assignment includes identification of not only the policy recommendations, but also the rules and methods for calculating the track access charges. Furthermore, in the Technical Proposal Atkins has noted that it is critical for the provided recommendations to fit with the EU legal requirements. In that respect, the report identifies consistent TAC as one of the key policy recommendations for Rail Baltica. For the report to have real added-value and fulfil the intended scope, it shall include the analysis and methods/principles for achieving the recommended consistent TAC level in the Baltic States, which shall be in line with the applicable EU legal requirements. Currently the report shaped on a very theoretical level and lacks practical approach	TAC charging is subject to EU legislation and this is covered in detail in the report. The principles of EU legislation are superior legally to any national legislation and are used to govern the recommendations in this report. EU legislation allows railways to vary their charging in accordance with the priorities of national governments, as long as such variations fit within the principles of EU legislation outlined in this report. In both the presentation and the report, it is set out how this might be achieved on the Rail Baltica route. However the TAC charging rules should follow policy rather than determined policy themselves. The work in this report suggest that the complexity of calculation and administration, for example the difficulty in determining and Mark Up for freight, effectively limit the choices of the national governments within the framework of the EU legislation. as a further example the report and presentation sets out how Direct Costs could be calculated from the work required to inspect, operate, maintain and renew the rail infrastructure including the likely cash flow from having new built infrastructure. It is important to note that this report was commissioned under Rail Baltica professional services framework, which includes a maximum fee that had also to cover concession letting and procurement of rolling stock as separate subjects, to the same level of detail as TAC. It is outside of the remit of this report to say how consistency will be achieved across the three nations of the Baltic States. We note the progress made to agreeing 12 common principles including for TAC, capacity allocation and traffic management. We note also that some stakeholders have supported there being a single IM.	Atkins	26.04.2022	26.04.2022

24	Table 2-1 & 2.5.4 TAC	10 &21	LTGI	04/04/2022	Please provide a reference to the applicable EU legislation which allows/enables the identified constituent elements of TAC (e.g. similarly as in Slide 3 of this report - https://webgate.ec.europa.eu/multisite/primeinfrastructure/sites/default/files/events/04_02_deep_dive_study_prime_17_updated.pdf) Also, please refer to page 21, where it is noted that TAC consists only of Direct Costs + Mark up	The constituent elements are shown in the report. It was helpful to send the Deep Dive Study on Charging and Funding of European Infrastructure Managers report which is now included in the appendix.	Atkins	26.04.2022	26.04.2022
25	Table 2-1	10	LTGI	04/04/2022	The report and the applicable legislation identifies only two elements for the calculation of TAC MAP: direct costs + mark ups. It is unclear how the remaining listed constituents can be considered as included within MAP	The tables states the constituent elements of TAC, and if they are included within MAP.	Atkins	26.04.2022	26.04.2022
26	Issues with calculating the price of mark up element of TAC	12	LTGI	04/04/2022	TAC elements are determined by the applicable legislation, not by the Regulator	Please see previous comments on the role of the Regular with TAC. When the word determine is used, this is used in a legal manner, and not that the Regulator sets the TAC.	Atkins	26.04.2022	26.04.2022
27	Access Charges and Government contributions (Network Grant)	22	LTGI	04/04/2022	Please clarify if a direct network grant is meant/used in the context of the obligation of the Member States to ensure the financial equilibrium of the Infrastructure Managers, as provided under Article 8 of the Directive 34/2012?	Reference to the direct grant details three different ways in which it can be used to ensure that the IM is financially sustainable.	Atkins	26.04.2022	26.04.2022
28	Access Charges and Government contributions (Network Grant)	22	LTGI	04/04/2022	The chapter refers to a figure which highlights three ways that the Network Grant can be provided to an Infrastructure Manager. However, no actual figure is provided	Reference to "figure below" removed, as the figure is in the appendix section.	Atkins	26.04.2022	26.04.2022

29	Lessons for Rail Baltica	38	LTGI	04/04/2022	Is it understood correctly that based on the case study analysis, there are no examples in the EU of a consistent/coordinated TAC on cross-border infrastructure?	That is correct, we have found no evidence where the TAC is co-ordinated. Examples exist outside the EU of where haulage rates charged to customers are coordinated. UTLC is owned jointly by the railways of Belarus, Russia and Kazakhstan. In order to be able to offer customers between China and Europe a simple all inclusive tariff, the parties have agreed their division of revenues. It is believed that a common formula is used for haulage and TAC combined. Please note though that each of these railways are not offering TAC rates for the operation of services by other nations, or third parties.	Atkins	26.04.2022	26.04.2022
30	Table 2-8	44	LTGI	04/04/2022	MCA does not consider such criteria as: (i) asset lifecycle (or maintenance) which is included in the Assignment (naturally, with higher traffic intensity the wear and tear of the infrastructure would also be higher); (ii) Network Grant (or financial burden to the States)	Asset lifecycle is discussed in the report, however while asset lifecycle was one of many criteria that might be included in the MCA, it was not found to be a discriminating factor.	Atkins	26.04.2022	26.04.2022
31	Table 2-8 - 2-11	44-48	LTGI	04/04/2022	The report provides no results or concluding remarks of the MCA. Also, some of the qualitative assessments lack detail and argumentation. For example, it is unclear why under a low TAC scenario the Environmental Impact has a score of 10 and why environment related incentives or policy objectives would be a factor only under this scenario.	It is important to note that this report was commissioned under Rail Baltica professional services framework, which includes a maximum fee that had also to cover concession letting and procurement of rolling stock as separate subjects, to the same level of detail as TAC.	Atkins	26.04.2022	26.04.2022
32	Axle loads and environmental factors	48	LTGI	04/04/2022	It is noted that Sweden is one of the countries which sets the TAC based on market-orientated approach. However, in the MCA analysis which is provided in the previous chapter, Sweden is considered under a "low TAC scenario" and not under "market-orientated scenario". Please clarify	Agreed. Sweden does have a market orientated TAC for freight, but not passenger. And because of the complexity of trying to charge a premium for freight track access, most freight in Sweden actually has a low charge. The figures as distorted for freight and Sweden by a small number of very heavy traffic flows, which are premium priced.	Atkins	26.04.2022	26.04.2022

33	Levels of Network Grant	50	LTGI	04/04/2022	In the report, Sweden is presented as the country which has one of the lowest Network Grants and is referred to as the best practice. However, based on the Deep Dive Study on Charging and Funding of EU infrastructure managers (https://webgate.ec.europa.eu/multisite/primeinfrastructure/sites/default/files/events/04_02_deep_dive_study_prime_17_updated.pdf), the State funding received by the Swedish IM is one of highest among the IMs that were analyzed. Please explain the inconsistency in these findings and assessments	Sweden network state grants allows 30% to 50% of the cost of rail to be granted, and this has been accepted by the European commission. Sweden has a large network and the comparison made in the report is of the grant, is per route KM. It is noticeable that the differential of the grant per passenger KM (as opposed to route KM) is lower.	Atkins	26.04.2022	26.04.2022
34	Discussion for each country	51	LTGI	04/04/2022	Please elaborate the paragraph on the environmental scheme that is used by Swedish infrastructure manager to provide grants to rail operators	This is not possible at this late stage. It is important to note that this report was commissioned under Rail Baltica professional services framework, which includes a maximum fee that had also to cover concession letting and procurement of rolling stock as separate subjects, to the same level of detail as TAC.	Atkins	26.04.2022	26.04.2022
35	Analysis of best practice	58	LTGI	04/04/2022	It is noted that the Direct Cost component of TAC in Rail Baltica will have to be calculated by considering the forecasted traffic, as no historic data will be available. However, Lithuanian Infrastructure Manager already has an operating 1435 mm infrastructure on the section Kaunas-PL/LT border which could be used for this purpose and serve more precise data than just the traffic forecast alone (even despite the differences in technical parameters)	Noted. The presentation and report discuss how an incremental opening approach has benefits in terms of charging.	Atkins	26.04.2022	26.04.2022
36	Direct Network Grant	60	LTGI	04/04/2022	Not quite clear why a direct Network Grant option is not recommended. There is no risk cross-subsidy risk as each State would be responsible for the financing of its designated Infrastructure Manager. If direct Network Grant are not recommended, what is the recommendation instead?	Because providing state support via a train operator (passenger) should help encourage the IM to be more customer focused, rather than a government lobbyist. Direct grants encourage IMs to divert attention from their core activities to securing political support for changes.	Atkins	26.04.2022	26.04.2022

37	A.1.1. Direct Costs	109 & 113	LTGI	04/04/2022	The report includes an assessment on existing practice to modulate the amount of direct costs based on the specifics of the traffic (train length, speed, axle load etc.). Has it been assessed if similar approach can be applied (or if it is applied anywhere in the EU) to modulate the direct costs based on the specifics of the infrastructure/part of the network that is used to run the traffic (in other words, to segment the direct costs)? This would be of particular importance for having a common/coordinated RB TAC, in case any of the RB IMs would be managing an extended network, not limited only to the Rail Baltica international line	Differentials are shown in TAC for different train characteristics in the report. But it is important to note that this report was commissioned under Rail Baltica professional services framework, which includes a maximum fee that had also to cover concession letting and procurement of rolling stock as separate subjects, to the same level of detail as TAC.	Atkins	26.04.2022	26.04.2022
38	General for Work Package 1	8-62	LTGI	04/04/2022	Based on the Assignment, the report had to include the assessment of best practice for service facility charging. Current report focuses only on TAC for the track, there is no assessment regarding the practices and recommendations for the service facilities	It is not yet clear which services outside of those mentioned in the report will need to be part of the TAC. Electrification is included. It is important to note that this report was commissioned under Rail Baltica professional services framework, which includes a maximum fee that had also to cover concession letting and procurement of rolling stock as separate subjects, to the same level of detail as TAC.	Atkins	26.04.2022	26.04.2022
39	General for Work Package 1	8-62	LTGI	04/04/2022	Based on the Assignment, the report had to include the assessment of best practices related to incentive/discount/penalty policies. The report includes some statements regarding environmental scheme used in Sweden, but the information and assessment are not substantive and not informative enough, there are no related policy recommendations for Rail Baltica	It is important to note that this report was commissioned under Rail Baltica professional services framework, which includes a maximum fee that had also to cover concession letting and procurement of rolling stock as separate subjects, to the same level of detail as TAC.	Atkins	26.04.2022	26.04.2022

40	General for Work Package 1	8-62	LTGI	04/04/2022	Based on the Assignment, the report had to include the assessment of best practices and then the benchmarking assessment through MCA related to capacity allocation and rules of prioritization. The report includes only general overview of the timetabling process and a general recommendation on prioritization of international passenger traffic. Also, the recommendation is then made to follow Sweden's capacity allocation mechanism which is based on socio-economic impact assessment, where every single train is assessed separately (neither train has priority). More accurate recommendations on capacity allocation and specifically priority rules should be provided for Rail Baltica. Also, it would be appreciated if Sweden's model, which is referred to as the best practice, would be explained in more detail.	Timetable processes were not part of the remit. Capacity allocation is mentioned but it is important to note that this report was commissioned under Rail Baltica professional services framework, which includes a maximum fee that had also to cover concession letting and procurement of rolling stock as separate subjects, to the same level of detail as TAC.	Atkins	26.04.2022	26.04.2022
41	General for Work Package 1	8-62	LTGI	04/04/2022	Data which is used for benchmarking is old and there are no references to the data source	We have used the Independent Regulators' Group as a source of reliable data. More up to date reliable data is not available.	Atkins	26.04.2022	26.04.2022

42	General for Work Package 1	8-62	LTGI	04/04/2022	The report notes that it is highly recommended to coordinate the capacity allocation and charging with Polish IM, however, Poland is not included in the benchmarking exercise. It is necessary to assess the practice used by Poland to see if it could be used as a basis for shaping the infrastructure access policies for Rail Baltica, or whether Poland should also be involved in the creation of infrastructure access policies for Rail Baltica (without Poland, any efforts related to access charging and capacity allocation only within the Baltic States would have a greatly lower effect, as large part of traffic is forecasted to go through the Rail Baltica line in Poland)	There is an opportunity to co-ordinate with Poland now, before prices are fixed, and to seek a mutual beneficial rate, so that one party does not seek to charge disproportional, that will be very difficult if individual nations try to negotiate with Poland rather than collectively. Agreeing a common rate with Poland is an aspiration, but commonality of pricing will have a benefit to the market.	Atkins	26.04.2022	26.04.2022
43	2.6.	23	EDzL	05/04/2022	This is not benchmarking analysis, but review of IRG findings. We have seen this report, so there is no new information. It is a must to have study from Network statements, analysing different TAC elements in EU countries as a part of benchmark, comparing also formulas used, suggesting the best one for RBGP.	We have used the Independent Regulators' Group as a source of reliable data. Further detail regarding the different elements of TAC, formulas, etc… is provided later in the report. Providing Rail Baltica with the "right" formula to use was not part of this commission. It is important to note that this report was commissioned under Rail Baltica professional services framework, which includes a maximum fee that had also to cover concession letting and procurement of rolling stock as separate subjects, to the same level of detail as TAC.	Atkins	26.04.2022	26.04.2022
44	3.2.2.3		EDzL	11/04/2022	Please amend the last sentence mentioned in section 3.2.2.3. "The implications of this will need to be considered by Rail Baltica and the three nation States involved.". Only each country has the rights to decide service contracting models and awarding principles	Wording amended.	Atkins	26.04.2022	26.04.2022
45	3.2.2.		EDzL	11/04/2022	Is there any state authority from Latvia who have predefined or confirmed Rail Baltica service plan by service type?	Service patterns directly from Operational Plan. One for client….	Atkins	26.04.2022	26.04.2022

46	3.2.2.1. and 3.2.2.2.		EDzL	11/04/2022	Please describe in details the contracting models mentioned in 3.2.2.1. and 3.2.2.2. including coordination mechanism between countries regarding finance, service requirements, etc.	Out of scope. Agreed with client that we would set out options rather than provide a solution.	Atkins	26.04.2022	26.04.2022
47	3.2.1.3.		EDzL	11/04/2022	Please provide the overview of summary mentioned in section 3.2.1.3. Please identify in each country detailed information regarding services type including cross-border services. Please include in the overview the responsibility of organization of public service transport (national level/regional level/mix), contracting authorities involved, contract award method (direct award or PSO).	Not been asked to make a recommendation. Asked to set out options. Think it is premature to define at this stage - need to understand how viable the services are likely to be.	Atkins	26.04.2022	26.04.2022
48			EDzL	11/04/2022	Please provide brief overview of your recommendations for each services type including cross-border services. Please include in this overview at least the following information - the responsibility of organization of public service transport (national level/regional level/mix), contracting authorities involved, contract award method (direct award or PSO).	This has not been provided in the study. But it is important to note that this report was commissioned under Rail Baltica professional services framework, which includes a maximum fee that had also to cover concession letting and procurement of rolling stock as separate subjects, to the same level of detail as TAC.	Atkins	26.04.2022	26.04.2022
49			EDzL	31/03/2022	Did you find an example of PSO being used jointly by more than one country other than Verkehrsverbund model in Germany? Any recommendations on effective cooperation model among several Competent Authorities? You mention that the German model could be worth further examination. More deeper analysis would be appreciated.	We added in this model as a request, but have not undertaken analysis of other models. This was an add-on for this study.	Atkins	26.04.2022	26.04.2022
50			EDzL	31/03/2022	The information provided in the first sentence of this slide is known for us. We have read it in publicly available documents. Please specify in details how two or more Competent Authorities could cooperate in order to develop common specification or requirements for the service. Please explain in details why we need to involve Shadow operator regarding passenger service contracting models? Virgin operator concept should be clarified/explained in study as it appears in presentation.	The presentation that is within the report was created to present progress to the client. The Report information supersedes the Slides	Atkins	26.04.2022	26.04.2022

51			EDzL	31/03/2022	We are fully aware that any decision on Track Access Charges and rolling stock financing will have an impact on viability of service. Instead of questions what would be your recommendations regarding the next steps we need to take before we make decision about service contracting model.	The presentation that is within the report was created to present progress to the client. The Report information supersedes the Slides. Clear recommendation in Section 3.2.3.3.	Atkins	26.04.2022	26.04.2022
52			EDzL	31/03/2022	What kind of information you analyzed before you came to conclusion that it is difficult to determine if there is a commercial case for operating certain services? Have you analyzed previous studies of RB Rail including CBA? What kind of information you analyzed before you came to conclusion that it is difficult to determine if there is a commercial case for operating certain services? Have you analyzed previous studies of RB Rail including CBA?	The presentation that is within the report was created to present progress to the client. The Report information supersedes the Slides. This is address in section 3.2.3.3. of the report.	Atkins	26.04.2022	26.04.2022
53			EDzL	31/03/2022	The information provided is not sufficient for further recommendations. Please provide the full list of best practice analysis including examples and other evidences mentioned in this slide. In the first sentence of this slide, it is written that services tend to be operated as PSO. Please give any figures which could confirm your conclusion. Please name any example of regional local service and regional cross border service practice which you have analyzed during the study.	The presentation that is within the report was created to present progress to the client. Information on 6 Benchmarking countries can be found in section 3.2.1.	Atkins	26.04.2022	26.04.2022
54			EDzL	31/03/2022	We are fully aware of main passenger service contracting models (open access un public service contracts)	Brief was to identify options available.	Atkins	26.04.2022	26.04.2022
55	3.1.2.	68	EDzL	05/04/2022	The tasks mentioned in the first paragraph are not the tasks of the Regulatory Body, but the competent authority - as defined in the Regulation - any public authority or group of public authorities of a Member State or Member States which has the power to intervene in public passenger transport in a given geographical area or any body vested with such authority. More than - in accordance with the Directive 2012/34, regulatory body independent from any competent authority involved in the award of a public service contract.	This does not contradict the text in the report.	Atkins	26.04.2022	26.04.2022

56	3.1.2.1.	66	EDzL	05/04/2022	The impact to PSO was dealt already in the Directive 2007/58, opening the possibility for the international trains carry passengers also within one country. The fourth railway package, opening the open access market for all the services, simply extended the scope of regulation concerning mitigation of impact on PSO contracts to any type of open access passenger services (not only international).	Agreed	Atkins	26.04.2022	26.04.2022
57	3.1.1.5	66	EDzL	05/04/2022	The mentioned workforce issue was just a particular aspect for PSO tendering process.	Agreed	Atkins	26.04.2022	26.04.2022
58	3.1.1.4	65	EDzL	05/04/2022	Regulation 1370/2007 do not deal with the open access, but sets up PSO contracting procedures for land transport services both by road and rail.	Text amended	Atkins	26.04.2022	26.04.2022
59	2.8.2.3	38	EDzL	05/04/2022	What exactly is meant by the coordination? Rail Baltica will be a part of RFC8 and therefore will be within the procedures of that corridor. What is proposed for the other mentioned corridors, keeping in mind, that the path allocation is closely related with the practical traffic planning.	Within this context, path allocation should be co-ordinated with Poland to help ensure robust timetable paths are identified.	Atkins	26.04.2022	26.04.2022
60	2.8.1.	34	EDzL	05/04/2022	Charging and capacity allocation are quite distinct topics, the corridor regulation is aimed to smooth train running, for that reason it is focused on the path allocation (which is closely interrelated with the traffic planning)	Agreed that both are distinct topics.	Atkins	26.04.2022	26.04.2022
61	2.8.1.	33	EDzL	05/04/2022	What is meant by "EU approval" in the second paragraph?	Must follow guidance from EU Directive 913/2010	Atkins	26.04.2022	26.04.2022
62	2.7.1.	32	EDzL	05/04/2022	What is "Ordinance No 41 of 27 June 2001?, this is not a part of the EU legislation?!	This is a court finding clarifying TAC that comes from a case that emerged from Bulgaria.	Atkins	26.04.2022	26.04.2022
63	2.4.	15	EDzL	05/04/2022	Not clear idea of this introductory part. The most challenging part is in close interrelation with the traffic planning in order to accommodate all requests under the technical capabilities and restrictions and get an efficient use of the line.	The introduction is an introduction to the wider topic of capacity allocation. We agree that timetable services is challenging as set out in 2.4.1	Atkins	26.04.2022	26.04.2022
64	2.5.1.2.	17	EDzL	05/04/2022	What is "Network Granting safety approvals"? No such terms in the mentioned directive (is the safety certification meant?)	Text incorrect in report, should say "granting safety approvals". Report has been amended.	Atkins	26.04.2022	26.04.2022

65	2.5.1.3	17	EDzL	05/04/2022	Regulation 1370/2007 do not deal with the open access, but sets up PSO contracting procedures for land transport services both by road and rail.	Agreed, the report says that regulation 1370/2007 sets out the rules for PSO contracts - although the main focus of the third railway package was concerned with open access.	Atkins	26.04.2022	26.04.2022
66	2.5.1.4	17	EDzL	05/04/2022	The mentioned TAC rules have been set up already in the Directive 2001/14. Also the Directive 2012/34 is not a part of the fourth railway package (it was amended by it), this directive is a recast of several earlier directives.	The report states 2001/14 is part of the first railway package in section 2.5.1.1. The report states that the Fourth Railway Package was launched in a document with the title, 'The Fourth Railway Package – Completing the Single European Railway Area to foster European Competitiveness and Growth', dated 30/1/2013. The amending role is now of 2012/34 is now clear in the text.	Atkins	26.04.2022	26.04.2022
67	2.5.1.4	18	EDzL	05/04/2022	The mentioned workforce issue was just a particular aspect for PSO tendering process.	Agreed, other aspects also mentioned in the report.	Atkins	26.04.2022	26.04.2022
68	2.5.1.4	18	EDzL	05/04/2022	Directive 2016/2370 is amending the directive 2012/34 and cannot be used itself, without the context of the 2012/34.	Agreed, it is still part of the legislation.	Atkins	26.04.2022	26.04.2022
69	2.5.1.4	18	EDzL	05/04/2022	The mentioned in the last paragraph was not due to the EP discussions, but mostly due to the MS positions in the Council (there is a co-decision procedure, where both EP and the Council are involved)	Agreed, but the delay occurred during passage through the EP.	Atkins	26.04.2022	26.04.2022
70	2.5.1.6	19	EDzL	05/04/2022	Once again - the RB must not decide TAC otherwise than within the regulatory procedures. (See info un the Sheet 2, as well as the first general comment). Therefore also it cannot be a task for the regulators' group to establish a TAC framework (mentioned in the last paragraph on the page), as this is conflicting with their supervisory functions.	Please see previous comments on the role of the Regular with TAC.	Atkins	26.04.2022	26.04.2022
71	2.5.3.2	20	EDzL	05/04/2022	To be precise the Directive gives the Memeber States right to decide on application of mark-ups (which could be delegated to IM on the national level), however all the practicalities are indeed addressed to infrastructure managers.	Agreed, subject to regulatory approval.	Atkins	26.04.2022	26.04.2022

72	2.2.1.	9	RBE	11/04/2022	"*The TAC paid by RU is formally determined by the regulator for that railway."* This wrong assumption. TAC is determined by IM (only EE there is currently framework that foresees NSA as charging body - but this is very rare setup. In EU usually IM is charging body). Please consider changing this assumption.	Most TAC is calculated by the relevant IM, and this is allowed un EU legislation. However to ensure compliance with the regulations, transparency, etc… EU law requires that such charges are formally signed off by an independent regulator. The regulator should have the power to amend or reject such charging if not in accordance with the relevant legislation or defined policies, and as such legally is responsible for their formal determination.	Atkins	26.04.2022	26.04.2022
73	2.2.2.	10	RBE	11/04/2022	"Therefore, in this report it is assumed that TAC is coordinated across-borders consistent as possible and not influenced by national legislation. No assumption has been made on how this will be achieved." I would say, this is the main question of such a study. Therefore, it is quite questionable assumption. No doubt that TAC is coordinated across-borders, but still national legislation should be considered. Consultant has taken the position that national legislation is not considered. In that case, any of the recommendation is doubtful, because it does not reflect the potential impact and practicalities for implementation. I recommend to change assumption.	The report has assumed that TAC will be co-ordinated and this is consistent with RB policy as set out in Rail Baltica Infrastructure Model Implementation annual progress report number 1, for the period Jan to Dec 2021. It is impractical to consider national legislation that might conflict with this because such national legislation has not been proposed. The consequences of having a uncoordinated TAC was set out in detail in the presentation and also in the report. The assumption that national legislation will follow EU legislation is consistent for the remit for this study. For this assumption to be changed, the remit for the study would need to be changed. Critical to this study, was an examination of EU legislation and consideration in how this has been implemented elsewhere, in addition to which this report has shown how such legislation might be implemented on the Rail Baltica route.	Atkins	26.04.2022	26.04.2022

74	2.3.1.	10	RBE	11/04/2022	Could you explain in detail of such a kind of categorization of TAC. According to the EU legislation and common practice, under TAC is meant direct costs as well as mark ups to cover indirect costs of the MAP and other charges (e.g. noise). Based on 909 EU reg and Directive 34/2012 could you explain your chosen categorization. I do not understand fixed, or supplemental charge context in current legislation.	This are explained in more detail further in the report, particularly section 2.5.2 to 2.5.5.	Atkins	26.04.2022	26.04.2022
75	2.3.1.	12	RBE	11/04/2022	Statement is not fully correct: "however the level of Mark Up uniquely does not need to be published and transparent (able to be calculated in advance) and can be considered as flexible." **Directive sets quite clear statement:** "*In order to obtain full recovery of the costs incurred by the infrastructure manager a Member State may, if the market can bear this, levy mark-ups on the basis of efficient, transparent and non-discriminatory principles, while guaranteeing optimal competitiveness of rail market segments. The charging system shall respect the productivity increases achieved by railway undertakings."*	Details of the calculation do not need to be published, but the principles need to be transparent. This is what the report says.	Atkins	26.04.2022	26.04.2022

76	2.3.1.	12	RBE	11/04/2022	Whole text from page 12-13 is consultants subjective opinion. Could not find any references. How this information is transferable to RB case study. e.g. "*Atkins recently was asked to price several trains to the Baltic States to inform the investment case for new wagons. It proved impossible to secure sufficiently firm rates for commodity traffic that in summary meant the client was unable secure authority to invest in wagons."* What was the problem? Please explain in more detail, otherwise it looks to the reader that in Baltics its impossible to get the firm rates.	First elements of 12 and 13 are the logical application of EU legislation and the implications for RB. The examples were chosen to add colour to the narrative only. The specific problem was that the complexity of TAC meant that the client chose against using rail, and the traffic was lost.	Atkins	26.04.2022	26.04.2022
77	2.3.1.	13	RBE	11/04/2022	Too general case studies. Can you bring more detail, reference and explain the cases, otherwise its just a unroofed statements - that can be true or not / depends where you look, from IM side or RU side.	These examples were illustrative only to add colour to the narrative. It is important to note that this report was commissioned under Rail Baltica professional services framework, which includes a maximum fee that had also to cover concession letting and procurement of rolling stock as separate subjects, to the same level of detail as TAC.	Atkins	26.04.2022	26.04.2022
78	2.3.1.	14	RBE	11/04/2022	Atkins :" *For example, it is allowed under EU law for an IM to offer a variation based on the use of technologies that reduce the cost impact of providing access (such as the use of "low track force" bogies that reduce track wear) but these are generally a* ***discount/surcharge on the Direct Cost element of the TAC****. Best practise is for the net impact of such services to be neutra*l." Could you give some examples, where Direct Cost can be discounted, and why you state neutrality in such cases? So far only special regulation to reduce TAC's including Direct costs is EU regulation related to Covid impact. Could you refer other legal base for reducing Direct Cost.	The example of low track force bogies is given, but it is thought that there are few places where TAC has been reduced as a result of this allowance under EU law. This is because verifying that new technology reduces direct costs is not simply, and the pace of technological change is not rapid. The remit of this study was to set out EU law and the principle is clear in this case.	Atkins	26.04.2022	26.04.2022

79	2.3.3.	15	RBE	11/04/2022	Study is ordered by European Commission not by IM's only. Could you specify sentence that ends with "will be anecdotal." What will be anecdotal or what is anecdotal?	Unless the report is shared in full any information contained in it will be transmitted through third parties, and there by definition anecdotal. PRIME would not release the report, but may do so on a request from RB Rail or the IMs of the Baltic states. This is explained in detail in the text.	Atkins	26.04.2022	26.04.2022
80	2.5.1.5.	18	RBE	11/04/2022	How your statement is justified :"*It is possible to discriminate between different types of traffic, for example between freight and passenger as both has different Direct Cost and operate in different markets (With different Mark Ups).*" Examples that you refer does not prove that the discrimination is taken place. Different mark-ups does not mean directly that this is the discrimination.	In English "discrimination" is not always negative, merely that markets are treated differently. Passenger rates and freight rates can be different.	Atkins	26.04.2022	26.04.2022
81	2.5.1.6.	20	RBE	11/04/2022	Please justify your statement: "Baltica is assumed to become the IM and a multi-national entity then the regulator will need to a multi-national entity or that the separate national IMs are bound by international rules that means they are forced to act uniformly. The requirement for such rules means that any super-national Rail Baltica IM may need to be established by treaty (or binding contract), and such a contract will probably be required to define the parameters for the pricing of the TAC, and probably the level of Network Grants it could be given to the IM." Is it a opinion or proofed statement because based on my experience with EE regulatory authority current legal framework suits well for RB IM's (current coordination in gas/electricity market is good example).	English was not clear in the report and is now amended. It will be chaotic for three sperate regulators to manage a single IM without co-ordination.	Atkins	26.04.2022	26.04.2022
82	2.5.4.1.	22	RBE	11/04/2022	Figure 2-3 is not self explanatory. Could you give more explanation what you mean by TAC fitting the wider fin framework.	Figure 2.3 shows that the Total Admissible Cost is equal to income from the TAC and stake subsidies, and the elements from which it is constituted. It is designed to help guide readers through that section of the report.	Atkins	26.04.2022	26.04.2022
83	2.5.5.	22	RBE	11/04/2022	You refer to some figure. What figure, there is no figure in this paragraph.	Reference to "figure below" removed, as the figure is in the appendix section.	Atkins	26.04.2022	26.04.2022
[No]	[Chapter, title]	[page]	[Name, Surname] [Organization]	[Date]	[Comment text]	[Answer text]	[Name, Surname] [Organization]	[Date]	[Text]

11. Comment received on the role of the regulator on TAC by EDZL

The following is a comment received by EDZL during a meeting on the 27/04/22, regarding the role of the regulator on TAC:

"43 In that regard, it should be noted that neither Article 30 of Directive 2001/14 nor any other provision of that directive lays down a procedure for the approval of infrastructure fees or variables enabling those charges to be determined.

44 In particular, no provision in Chapter II of Directive 2001/14 on infrastructure charges establishes such an approval procedure. As regards the powers of the regulatory body, in accordance with Article 30(2) of Directive 2001/14, decisions adopted by the infrastructure managers, in particular those relating to the charging scheme or to the level and structure of infrastructure charges, may be challenged before that body. Paragraph 5 of that article states that the regulatory body is to be required to decide on any complaints submitted to it. In addition, it is apparent from paragraph 3 of that article that that body is responsible for ensuring that charges set by infrastructure managers comply with the provisions of that directive and for monitoring negotiations between those managers and railway undertakings. In order to carry out those tasks, the regulatory body is empowered, under Article 30(4) of Directive 2001/14, to request information, in particular from the infrastructure managers.

50 It follows from the foregoing that Article 30 of Directive 2001/14 does not lay down a procedure for the approval of infrastructure charges. In particular, paragraphs 2 to 5 of that article do not require infrastructure managers to subject the infrastructure charges that they intend to levy or variables used to calculate them to the regulatory body for approval. On the contrary, those provisions merely provide for a review of the charges already set, which is apparent, in particular, from paragraph 2 and the first sentence of paragraph 3 of that article. That review is a matter for the regulatory body which gives its decision either in the context of an appeal or on its own initiative.

51 Furthermore, the system established by Directive 2001/14 seeks to ensure the management independence of the infrastructure manager. The latter must use the charging scheme as a management tool. Thus, recital 12 in the preamble to that directive that states that charging and capacity-allocation schemes must encourage railway infrastructure managers to optimise use of their infrastructure within the framework set out by Member States. In order to make such optimisation possible, those managers must have a certain degree of flexibility, as mentioned in recital 20 of that directive (judgment of 28 February 2013, Commission v Germany, C-556/10, EU:C:2013:116, paragraph 82).

52 In that regard, Article 4(1) of Directive 2001/14 establishes a division of powers as between the Member States and the infrastructure manager with regard to charging schemes. The Member States are to establish a charging framework, while the determination and collection of the charge are tasks to be performed by the infrastructure manager, who is required to ensure the application of uniform principles, as provided for in particular in Article 4(4) and (5) of that directive

(judgments of 9 November 2017, CTL Logistics, C-489/15, EU:C:2017:834, paragraph 49, and of 28 February 2013, Commission v Germany, C-556/10, EU:C:2013:116, paragraph 84).

53 Accordingly, it is for the infrastructure managers, who are required to set and collect the charges in a non-discriminatory manner, not only to apply the rail network conditions of use in an equal manner to all users of that network, but also to ensure that the charges actually received meet those conditions (judgments of 9 November 2017, CTL Logistics, C-489/15, EU:C:2017:834, paragraph 50, and of 8 July 2021, Koleje Mazowieckie, C-120/20, EU:C:2021:553, paragraph 43).

54 Since, as is apparent from the foregoing considerations, Directive 2001/14 does not provide for a procedure for approving infrastructure charges or the variables used to determine those charges, it cannot determine whether one or another legal or natural person has the status of 'party' in such a procedure.

55 Furthermore, the concept of 'party', used in the Code of Administrative Procedure, falls outside the scope of that directive. In particular, appeals against decisions adopted by infrastructure managers, provided for in Article 30(2), are available to 'applicants'. The latter concept, defined in Article 2(b) of Directive 2001/14, covers, inter alia, any licensed railway undertaking.

56 It should also be noted that, for the purposes of answering the first question, there is no need to examine whether Article 30 of Directive 2001/14 and, in particular, paragraphs 2 and 3 thereof, precludes an approval procedure such as that provided for by Polish law. In particular, it does not appear necessary to determine whether, in the light, in particular, of the objectives pursued by that directive and the principle of effectiveness, those provisions are contrary to the approval, by the president of the ORT, of one of the variables which allow the infrastructure manager to determine the amount of infrastructure charges payable by a railway undertaking, namely the unit rates of the basic charge for minimum access to railway infrastructure."

Atkins Limited
Nova North
11 Bressenden Place
Westminster
London
SW1E 5BY

Tel: +44 (0)20 7121 2000
Fax: +44 (0)20 7121 2111