

APPENDIX

D

IMPACT ASSESSMENT modelling appendix

1 Impact assessment methodology

Introduction

The first section of this impact assessment modelling appendix details the methodology of the impact assessment carried out to assess the economic, social and environmental impacts related to the options set out in Chapter 5 of the main report. It includes details of key inputs and assumptions used to derive the baseline scenario and the impacts of the individual options.

Identification of impacts of options

The options as set out in Chapter 5 of the main report are intended to primarily directly impact the following:

- Vehicle authorisation timescales
- Vehicle authorisation costs
- Railway Undertaking certification timescales
- Railway Undertaking certification costs
- Number of national rules

Further, there are likely to be significant opportunity cost savings resulting from a reduced time to market for railway vehicles. These will derive from a number of sources including, reduction in cost of leasing additional vehicles to cover those unavailable, reduced loss of revenue from non-running of services and lower storage costs. Given the significant nature of these benefits they have been quantified (albeit at a high level) as part of the impact assessment together with the direct impacts set out above.

It is anticipated that there will be further indirect impacts, in particular, as a result of reductions in the cost and timescales of vehicle authorisation. For example, operators could decide to operate additional services which prohibitive authorisation costs previously rendered unviable. Appendix Table D.1 sets out a list of impacts and indicators that reflect both direct and indirect impacts of the options with Appendix Figure D.1 further illustrating the flow of causality between the different impacts flowing from changes in authorisation and certification costs and timescales. Appendix Table D.1 also shows which indicators have been assessed quantitatively and which have been assessed only qualitatively.

Finally, measure 4.7 (Enhanced role of ERA in identifying potential spare parts to be standardised and coordination of industry activities in this area) will impact costs of maintenance across the EU rail industry. All the options are therefore directly linked to the problems identified in Chapter 3 as shown at the end of Chapter 5.

APPENDIX TABLE D.1 IMPACTS OF OPTIONS - SUMMARY OF POSSIBLE IMPACTS

Impact	Impact Category	Indicator to be quantified/key relevant indicators	Quantitative assessment
1 st country authorisation costs	Economic	Total 1 st country authorisation costs	Y
Additional country authorisation costs	Economic	Total additional country authorisation costs	Y
1 st country authorisation timescales	Economic	Average 1 st country authorisation timescales	Y
Additional country authorisation timescales	Economic	Average additional country authorisation timescales	Y
1 st country safety certification costs	Economic	Total 1 st country safety certification costs	Y
Additional country safety certification costs	Economic	Total additional country safety certification costs	Y
1 st country safety certification timescales	Economic	Average 1 st country safety certification timescales	Y
Additional country safety certification timescales	Economic	Average additional country safety certification timescales	Y
Number of National rules	Economic	Stage of removal/number of notified national rules	N
Effect on freight transport demand	Economic	Total rail freight tonne km	N
Effect on rail freight prices	Economic	Price per tonne km	N
Modal shift (freight)	Economic	Rail freight mode share	N
Effect on passenger transport demand	Economic	Rail passenger km	N
Change in service levels	Economic	Train km	N
Modal shift (passenger)	Economic	Rail passenger mode share	N

Impact	Impact Category	Indicator to be quantified/key relevant indicators	Quantitative assessment
Effect on operational costs	Economic	Total industry operational costs	Partially ¹
Effect on fares for passengers	Economic	Average fares for passengers	N
Effect on rail investment	Economic	Total rail industry capital expenditure on new and refurbished rolling stock	N
Effect on industry revenue	Economic	Total rail industry revenue	Partially ²
Effect on public funding	Economic	Total rail subsidy	N
Effect on market structure	Economic	New entrant market share	N
Effect on employment levels and working conditions	Social	Total rail employment Average wage	N
Effect on GHG emissions	Environmental	Total CO ₂ emissions (tonnes)	N
Noise emissions	Environmental	Total noise emissions (in dB(A))	N
Local air quality	Environmental	Concentration of atmospheric pollutants	N
Rail safety	Social	Number of fatalities	N
Passenger security	Social	Number of crimes on rail network	N
Maintenance Costs ³	Economic	Total Maintenance costs	N

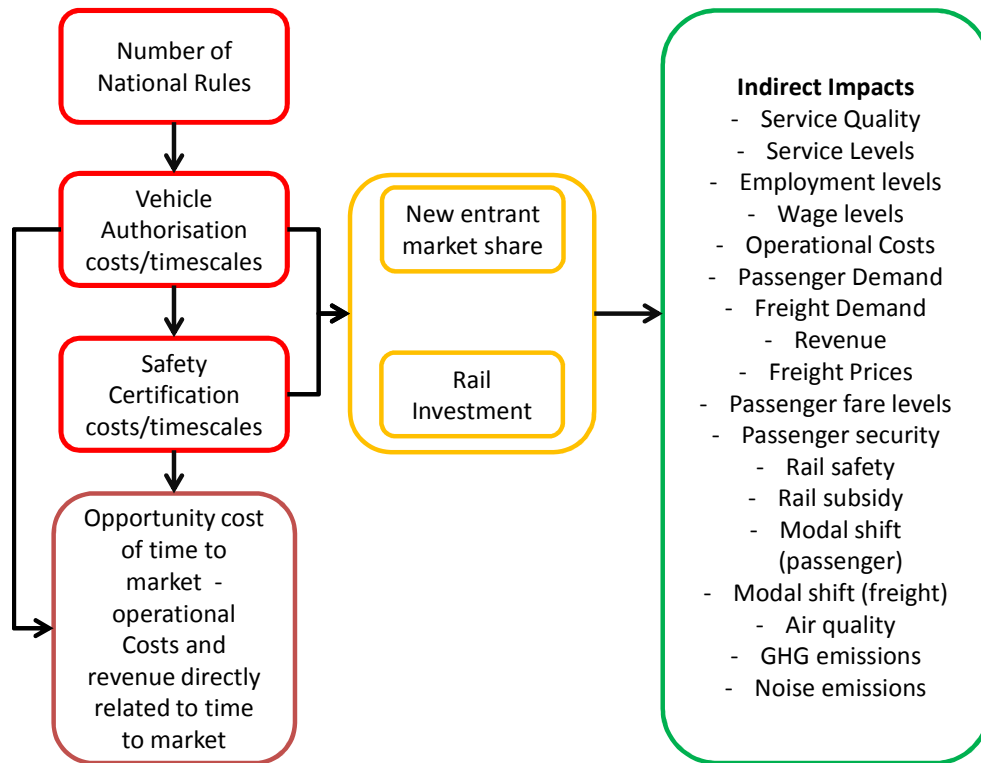
¹ Savings from operational costs as a direct result of a reduced time to market have been estimated as a combined 'opportunity cost' measure together with increases in revenue as a direct result of reduced time to market. Changes in operational costs due to increased new entry and additional services have not been quantified

² Increased revenue as a direct result of a reduced time to market has been estimated as a combined 'opportunity cost' measure together with reductions in operational costs as a direct result of reduced time to market. Changes in revenues due to increased new entry and extra demand generated by additional services has not been quantified

Impact	Impact Category	Indicator to be quantified/key relevant indicators	Quantitative assessment
Effect on EU budget	Economic	Increase in administrative costs of the Agency	Y
Effect on MS public finances	Economic	Change in administrative costs of NSAs and other public bodies (including cost of re-employing workers where it is not possible to make them redundant)	Y

APPENDIX FIGURE D.1

IMPACT RELATIONSHIPS



From the figure we see that there are a large number of indirect impacts that flow from changes in rail investment and new entrant market share, both of which are influenced by authorisation and safety certification costs. However, given the uncertainty around the impact of the options on new entrant market share and rail investment the impact analysis has focussed on the quantification of the indicators in the red boxes i.e. the direct impacts⁴.

³ This is included to capture the impact of measure 4.7 (Enhanced role of ERA in identifying potential spare parts to be standardised and coordination of industry activities in this area)

⁴ Note that quantity of national rules has not been explicitly estimated

Quantitative assessment

Using data gathered in the Stakeholder Consultation and additional market analysis we have populated an Excel spreadsheet (impact assessment calculator) which has been used to produce quantitative measures of the direct impacts of the different policy options. Where relevant the calculator has been used to place a financial value on indicators.

Commensurate with the anticipated legislative timescales for the introduction of new legal measures following this impact assessment, indicator values have been produced for a ten year future period (2015 to 2025). Where the metric is a monetary value it is presented in NPV terms using a discount factor of 4%, consistent with the impact assessment guidelines, with values discounted to 2012.

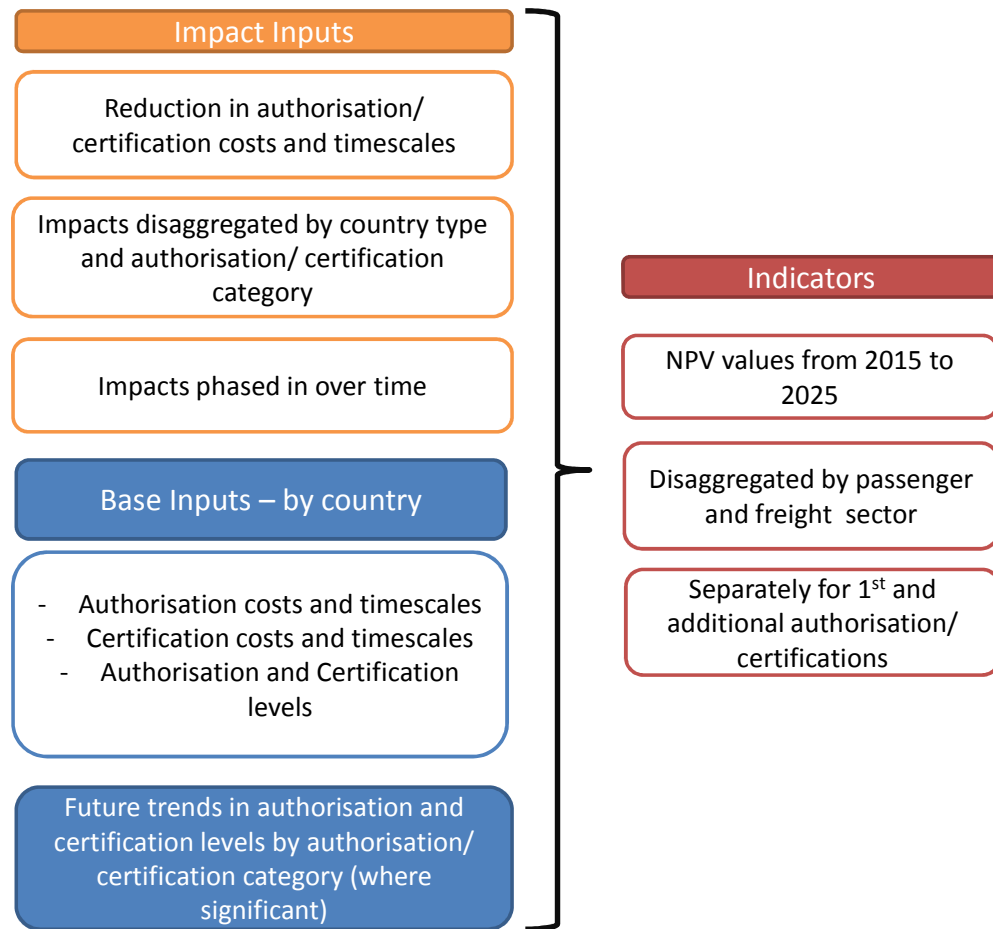
The baseline

The baseline scenario against which the policy options have been measured assumes that there is an evolution of the status quo as described in Chapters 3 and 5.

The Impact Assessment Calculator

Appendix Figure D.2 summarises the key inputs and outputs of the impact assessment calculator.

APPENDIX FIGURE D.2 FRAMEWORK FOR THE IMPACT ASSESSMENT
CALCULATOR



The calculator has three key input data sets:

- Impact on costs and timescales of authorisation and certification of the different options
- Current costs, timescales and levels of authorisation and certification by country
- Future trends in levels of authorisation and certification by authorisation/certification category (where significant change anticipated)

Current costs and timescales

The calculator allows for considerable disaggregation of authorisation inputs to capture the wide spread of costs and timescales that arise from the authorisation of different types of vehicles in different contexts. The different authorisation categories in the calculator together with the average assumed costs and timescales are set out in Appendix Table D.2. The calculator contains the functionality to input costs and timescales on an individual country basis although the limited data available means that for many countries we have had to use average values. Data used to populate the base data incorporates a range of sources including:

- Agency Cross-Acceptance report on vehicle authorisation⁵
- Data from the presentations given at the vehicle authorisation Task Force
- Data from interviews with industry stakeholders
- Some (minimal) data provided within the stakeholder survey

We have not provided within this report all the data that we have received through the above mentioned sources as it would risk removing the anonymity of the data sources and could jeopardise future studies of this kind.

A risk with the data used is the incentive for data providers to share data on their worst case experiences whilst not providing data from authorisation examples where the process has worked better. We have therefore used the available data with caution and in one particular example we have adjusted the raw data to reflect the impact of exceptional circumstances unlikely to be repeated for the majority of authorisations in the relevant category⁶. However, it is impossible to completely eliminate this possible bias and this should be borne in mind when interpreting the results.

Certification cost and timescale inputs require less disaggregation since scope for variation other than between country and passenger and freight RUs is limited (leaving aside discriminatory practices against non-incumbents) The different certification categories in the calculator together with the average assumed costs and timescales are set out in Appendix Table D.3. Again the calculator has the functionality to incorporate different values by country, although the limited data available means that for most countries we have had to use average values. Data used to populate the base data set incorporates a number of sources including:

- Agency impact assessment for the single safety certificate
- Data from stakeholder interviews and, where provided, the survey

It should be noted that the data available for safety certification costs (as in costs of preparing and submitting requests for certification rather than fees charged by NSAs) is very limited, with virtually no information received during the study at the country level. Data on fees is available at a country level for some countries, but fees are excluded in this analysis since they are captured in the administrative cost calculations discussed below. Likewise, data on timescales is available but the majority of data reflects only NSA response times and does not include RU/IM preparation time. As such, the cost impacts calculated for the options primarily reflect the faster implementation of the single safety certificate reducing the costs of additional country authorisation and the reduction of costs in Germany where there is evidence of a particularly long certification process. Calculated reductions in timescales reflect improvements in NSA response times and do not capture additional time savings on RU/IM preparation times.

⁵ Report on railway vehicle authorisation, European Railway Agency, 2011

⁶ For confidentiality reasons it is not possible to state in more detail the adjustment made.

APPENDIX TABLE D.2 AUTHORISATION CATEGORIES IN THE IMPACT ASSESSMENT CALCULATOR

Authorisation Category	Average cost (000€s)	Average timescale (months/Type)
New locomotive type authorisation (1st country)	6,000	24
New wagon type authorisation (1st country)	100	2
New Multiple Unit type authorisation (1st country)	600	24
New Coach type authorisation (1st country)	100	24
New locomotive type authorisation (additional country)	916	11
New wagon type authorisation (additional country)	0	0
New Multiple Unit type authorisation (additional country)	120	7
New Coach type authorisation (additional country)	0	0
Locomotive type re-authorisation without ERTMS (1st country)	750	12
Locomotive type re-authorisation with ERTMS (1st country)	1,500	12
Number of wagon type re-authorisations (1st country)	100	1
Multiple Unit type re-authorisation without ERTMS (1st country)	600	24
Multiple Unit type re-authorisation with ERTMS (1st country)	6,000	27
Coach type re-authorisation (1st country)	100	24
Locomotive type re-authorisation without ERTMS (additional country)	0	0
Locomotive type re-authorisation with ERTMS (additional country)	750	8
Number of wagon type re-authorisations (additional country)	0	0
Multiple Unit type re-authorisation without signalling (additional country)	0	0
Multiple Unit type re-authorisation with ERTMS (additional country)	2,000	6

Authorisation Category	Average cost (000€s)	Average timescale (months/Type)
Coach type re-authorisation (additional country)	0	0

Note: zero values relate to where there no reauthorisation is necessary.

APPENDIX TABLE D.3 CERTIFICATION CATEGORIES IN THE IMPACT ASSESSMENT CALCULATOR

Certification Category	Average cost (000€s)	Average timescale (months)
Safety Certification (1st Country) - Freight	21	5
Safety Certification (additional Country) - Freight	20	5
Safety Certification (1st Country) - Passenger	20	5
Safety Certification (additional Country) - Passenger	24	6

Current and forecast future levels of authorisation and certification

The most complete dataset on current authorisation levels is that compiled for the Agency's Cross-Acceptance report on vehicle authorisation. The data collected for this report has been made available to us for this study and has been used to construct base authorisation numbers for the different authorisation categories in the impact assessment calculator.

The data by the Agency disaggregates by country and vehicle type including new and existing vehicles. However, the dataset does not distinguish between first authorisations and additional country authorisations. This distinction is important since authorisation costs can be significantly different for first and additional authorisations, with examples given in interviews of first authorisations more than three times as expensive as additional authorisations.

The key assumptions that we have used to obtain the necessary disaggregation by first and additional authorisation are:

- The UNIFE estimate of savings from Cross-Acceptance assumes additional authorisations for each new locomotive and multiple unit type in ten countries. We have assumed that this ratio holds true for all new authorisations.
- Re-authorisations are all single country except ERTMS related authorisations which we assume are authorised in three countries in total⁷.

⁷ From our analysis we have seen that this varies according to vehicle type with some passenger rolling stock only being authorised in one Member State while locomotives, especially for freight, requiring authorisation in many Member States, as a result we have opted to use an average value of 3 for the purpose of the analysis.

- There are no wagon and coach additional authorisations (there will be some but numbers should be small)

In addition we have assumed that the number of authorisations related to ERTMS is directly proportional to the proportion of the European network covered⁸ by ERTMS.

The total number of vehicle authorisations for each vehicle category that we have used for the base position in the impact assessment calculator are shown in Appendix Figure D.3. The breakdown by authorisation category is shown in Appendix Table D.4.

The base year for authorisation numbers in the impact assessment calculator is 2008. The reasons for this are:

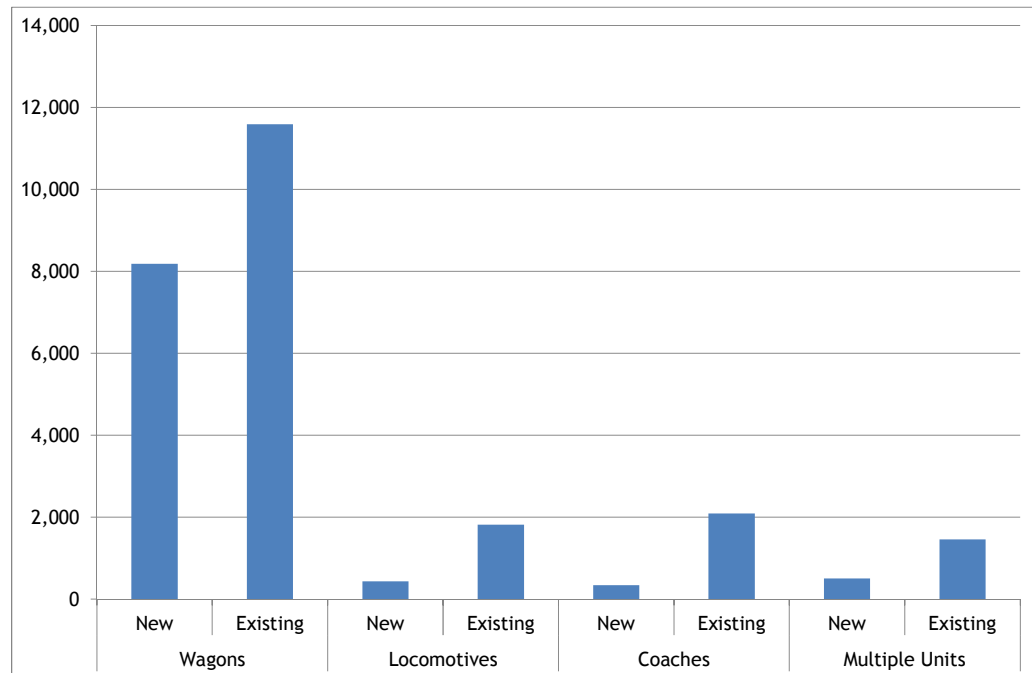
- The period 2009-2011 has seen very atypical patterns of authorisation due to the severe economic downturn experienced during this period. For example the agency estimated in the Cross-Acceptance report on vehicle authorisation that the number of vehicle authorisations in 2009 dropped nearly 10% compared to 2008.
- More recent data at the disaggregated level available in the Cross-Acceptance report on vehicle authorisation is not readily available.

Going forward there is clearly significant uncertainty as to the growth in number of authorisations and forecast growth rates in the Cross-Acceptance report are generally based on 2010 in the middle of the economic downturn. We have therefore used the 2008 level of authorisations⁹ to give us our base position (i.e. before the dramatic impacts of the economic downturn), but have then conservatively assumed no growth in vehicle authorisations over the study time period.

⁸ This includes routes for which ERTMS has been contracted but not yet implemented

⁹ We have used the 2008 total but at the individual category level have used an average of 2007 and 2008 to apportion the total between categories to reduce distortions present at an annual level caused, for example, by large individual orders. It should be noted that for some countries there is no data and as such the numbers represent a conservative estimate.

APPENDIX FIGURE D.3 BASE YEAR AUTHORISATIONS (2007/2008 ADJUSTED)



APPENDIX TABLE D.4 BASE YEAR AUTHORISATIONS IN IMPACT ASSESSMENT CALCULATOR

Vehicle Category	New (1st Country)	New (additional country)	Re-authorisation (1st country)	Re-authorisation (additional country)
Wagons	8,190	0 ¹	11,600	0 ²
Locomotives	40	390	1,760	60
Coaches	340	0 ³	2,090	0 ⁴
Multiple Units	50	460	1,410	50

^{1,2,3,4} Data on authorisation numbers did not distinguish between first and additional authorisations and we have therefore had to make some assumptions as to the proportions of each. As set out in paragraph .0-892820481205375282726912 we have assumed zero wagon and coach additional authorisations. In practice there will be a small number but at with the data available zero was the most appropriate (and robust) assumption.

Type size reduction

A key issue for the number of *Type* authorisations is the number of vehicles per type. It can be anticipated over time that market consolidation and market changes induced by the TSIs will reduce the number of vehicle types on the market. This is consistent with the Agency's analysis of the impacts of TSI scope extension.

We have used estimates quoted in the Cross-Acceptance report on vehicle authorisation from UNIFE to derive the evolution of type size over the period

2007/2008 - 2025 for locomotives and multiple units. For wagons and coaches we have assumed that type size for new vehicles reaches that of existing vehicles by 2015 and remains constant thereafter. The assumed Type size changes are shown in Appendix Table D.5.

APPENDIX TABLE D.5 TYPE SIZE CHANGES ASSUMED IN THE IMPACT ASSESSMENT CALCULATOR

Vehicle Category	Type Size	
	2007/2008	2025
New Wagons	105	148
Existing Wagons	148	148
New Locomotives	5	32
Existing Locomotives	13	13
New Coaches	22	22
Existing Coaches	22	22
New Multiple Units	16	87
Existing Multiple Units	35	35

Impact Inputs

The impact of the different options on costs and timescales are included at the same level of disaggregation as the base inputs, but not at the country level. However, the impacts of different policy options will differ according to the current industry context in any given country. For example, in countries which already authorise efficiently there will be a lower benefit from measures reducing authorisation costs.

To account for these complexities, impact inputs have been disaggregated to allow for different impacts in some countries where specific issues are known to exist. Inputs have then been expressed as percentage reductions of the gap between costs and timescales in each country type and the minimum that our analysis and research suggests is feasible. The country categorisations, which are based on the information that we have received through the stakeholder discussions and the desktop analysis, are:

- i) **Average** - this encompasses the majority of countries
- ii) **Challenging** - This category contains Germany and France since these countries have both been identified as having specific issues as discussed in Chapter 3. The challenges regarding Germany are well known whilst prospective new entrants in France have experienced particular difficulties in obtaining authorisation of vehicles. Measures that enforce greater

conformity with EU law are likely to have the greatest impact in these countries.

- iii) **Low resource** - A number of countries have very small numbers of NSA staff available to deal with authorisation and certification with the result that some measures are likely to particularly impact authorisation and certification in these countries. The countries we have included in this category are: Italy, Poland, Czechoslovakia, Estonia, Greece, Luxembourg, Portugal and Slovenia. All of these countries had less than 5 full time equivalent staff directly involved in interoperability issues, except Poland which is also included as the Polish NSA has many vacancies.

The minimum costs and timescales that we have assumed in the impact assessment calculator are set out in Appendix Table D.6 to Appendix Table D.9. These are based on the range of costs and timescales that we have assessed as part of the study.

APPENDIX TABLE D.6 MINIMUM POSSIBLE COSTS OF AUTHORISATION IN IMPACT ASSESSMENT CALCULATOR (€000)

Vehicle Category	New (1st Country)	New (additional country)	Re-authorisation (1st country)	Re-authorisation (additional country)
Wagons	100	n/a ¹	100	n/a
Locomotives	5,000	500	375 (without ERTMS) 750 (with ERTMS)	n/a (without ERTMS) 500 (with ERTMS)
Coaches	100	100	100	n/a
Multiple Units	480	200	480 (without ERTMS) 4,800 (with ERTMS)	n/a (without ERTMS) 2,000 (with ERTMS)

¹ Note that where costs are 'n/a' this reflects the assumption that there are no authorisations (at least at a significant level) for this authorisation category.

APPENDIX TABLE D.7 MINIMUM POSSIBLE TIMESCALES OF AUTHORISATION IN IMPACT ASSESSMENT CALCULATOR (MONTHS/TYPE)

Vehicle Category	New (1st Country)	New (additional country)	Re-authorisation (1st country)	Re-authorisation (additional country)
Wagons	1	n/a ¹	1	n/a
Locomotives	18	6	6 (without ERTMS) 8 (with ERTMS)	n/a (without ERTMS) 8 (with ERTMS)
Coaches	18	n/a	18	n/a
Multiple Units	18	12	18 (without ERTMS) 20 (with ERTMS)	n/a (without ERTMS) 6 (with ERTMS)

¹ Note that where timescales are 'n/a' this reflects the assumption that there are no authorisations (at least at a significant level) for this authorisation category.

APPENDIX TABLE D.8 MINIMUM POSSIBLE COSTS OF CERTIFICATION IN IMPACT ASSESSMENT CALCULATOR (€000)

Market	1st Country	Additional country
Passenger	18	0
Freight	18	0

APPENDIX TABLE D.9 MINIMUM POSSIBLE TIMESCALES OF CERTIFICATION IN IMPACT ASSESSMENT CALCULATOR (MONTHS/TYPE)

Vehicle Category	1st Country	Additional country
Wagons	3	0
Locomotives	3	0

A particular issue is the treatment of Germany where there currently exists a fundamental conflict between German and EU law. We have assumed (as set out in the previous chapter) that this is cancelled out through a positive outcome (for the Commission) of the infringement proceedings currently in process and hence a portion of the benefits from reduction of authorisation costs and timescales are included in the baseline.

Calculating the impact of options on authorisation costs and timescales

Calculation of impacts of options on authorisation costs and timescales is fundamental to the impact assessment. However, whilst we have data from a number of sources for a number of countries as to the costs and timescales of authorisation which indicates the size of the difference between efficient and non-efficient authorisation, there is no data that directly tells us how far any given option will reduce the cost and timescales towards the most efficient level of authorisation.

To increase the robustness of the estimates we have assessed the possible impacts of measures as systematically as possible. To do this we have used the following questions as a prompt when evaluating the measures:

Authorisation

- i) Does the measure address issues specific to a particular vehicle type?
- ii) Is the measure relevant for both 1st authorisation and additional authorisation?
- iii) Which elements of the authorisation process does the measure impact?
- iv) What other measures are interrelated?
- v) What are the timescales for implementation of the measure?
- vi) What are the timescales for the impact of the measure once implemented?
- vii) Will the impact be different in different countries?

Certification

- i) Does the measure address issues specific to freight or passenger Railway Undertakings?
- ii) Is the measure relevant for both 1st certification and additional certification?
- iii) Which elements of the certification process does the measure impact?
- iv) What other measures are interrelated?
- v) What are the timescales for implementation of the measure?
- vi) What are the timescales for the impact of the measure once implemented?
- vii) Will the impact be different in different countries?

Based on these questions we have then identified the likely scope of impacts, which authorisation and certification categories are likely to be impacted most significantly, timescales over which impacts will arise and where impacts are likely to differ significantly between countries. Measures have been categorised as having a low, medium or high effect where a low effect corresponds to a reduction of the gap between current average authorisation costs and 'perfect' authorisation costs of between 0 and 5%, medium 5-15% and high, greater than 15%.

Once each measure was assessed an overall assessment at option level was carried out to produce inputs for use in the impact assessment calculator. This amalgamated the impacts at an option level, applying adjustments to avoid double-counting of impacts when measures were added together.

Each option has been assessed as having a low, medium or high effect where low corresponds to a reduction of the gap between current average authorisation costs and 'perfect' authorisation costs of between 0-20%, medium with an impact of 20-50% and high with an impact of 50-100%.

It should be noted that the qualitative assessment of options 2 to 6 has been carried out on an incremental basis relative to the baseline. This means, for example, that whilst the baseline has been assessed overall as having a medium impact, option 2 has a low to medium impact. This does not mean that option 2 is worse performing than the baseline, rather that the incremental improvement in option 2 compared to the baseline is relatively small. The baseline is assessed as medium impact since it represents a substantial reduction in authorisation costs and timescales compared to the current position.

As explained in Chapter 5, we have assigned each option a descriptor which reflects the Agency's role in relation to NSAs. This is only for presentational reasons as the detailed description of the options shows that they not only include activities related to the NSAs, but also to the wider market.

Option 1: Baseline

A number of factors are expected to impact authorisation and certification costs and timescales in the baseline:

- i) Universal implementation of DV29
- ii) Entering into force of CR RST and LOC&PAS TSIs
- iii) Progressive elimination of open points
- iv) Improved staffing levels at NSAs
- v) Cross-Acceptance & tidy up of national rules
- vi) TSI scope extension
- vii) Improved 'self-regulation'

Analysis of the impacts of these factors is set out in Appendix Table D.10. This analysis draws on, amongst other sources, the Agency's evaluation of the benefits of TSI Scope extension. Whilst our estimates of improvements in the baseline are more conservative than those of the Agency they are still substantial with the gap between average authorisation costs now and minimum achievable costs, forecast to reduce by approximately 30% by 2025.

APPENDIX TABLE D.10 IMPACT ANALYSIS OF BASELINE FACTORS

Factor	Key impact characteristics (as prompted by question list)	Impact magnitude (low/medium/high)	Measure in place	Likely phasing of main impact
DV29 is commonly followed	Impacts should be felt across authorisation categories. Impact will be most significant in 'challenging' countries	Medium	2011	2011-2014
Entering into force of CR RST and LOC&PAS TSIs	The entering into force of these additional TSIs will increase the burden of applicable TSIs. In the short term this has the potential to further slow the authorisation process	Low	2011	2011-2018
Progressive elimination of open points	The elimination of open points should have a significant impact on authorisation over time but is a lengthy process	Medium	Benefits already being felt	2011-2020
Improved staffing levels at NSAs	Impacts should be felt across authorisation categories. Effects limited to countries where there is evidence of plans for improved staffing in the future (e.g. Italy and Poland)	Low (geographically limited)	2013	2013-2014
Cross-Acceptance & tidy up of national rules	This primarily benefits additional authorisation costs and is likely to be particularly significant for locomotive and multiple unit authorisations since these are the vehicle types for which the number of Cross-Acceptance agreements currently is most limited. Impacts are highly related to the number of open points. Tidy up of national rules will also impact 1st country authorisations.	High	Benefits already beginning to be felt	2011-2018
TSI scope extension	TSI scope extension will reduce the need to assess vehicles against national rules over time and also encourage migration to TSI compliant networks and vehicles	High	2014	2014-2017 main effect 2017-onwards continuing effect
Improved 'self-regulation'	Impacts likely to be patchy given dependence on self-enforcement	Low	Some measures already in place	On-going
Complete Baseline	The Baseline encompasses a wide range of impacts, a number of which (e.g. work on national rules) are likely to have a significant effect on authorisation costs and timescales. It is estimated that by 2025 the measures in place will close the gap between average authorisation costs and minimum achievable authorisation costs by over 30%. The impact on certification costs is however, much smaller with no significant initiatives to reduce certification costs.	Medium	2011	2011-2025

Option 2: Greater coordination role for the Agency

Analysis of the impact of measures included in Option 2 is set out in Appendix Table D.11. The analysis builds on the qualitative analysis set out in Chapter 5 of the main report.

APPENDIX TABLE D.11 IMPACT ANALYSIS OF OPTION 2 MEASURES

Measure	Key impact characteristics (as prompted by question list)	Impact magnitude (low/ medium/high)	Measure in place	Likely phasing of main impact
2.1.2: Enhanced “coordination” and supervision role of ERA with respect to NSAs regarding granting vehicle of authorisations and safety certificates, including ensuring their mutual recognition by national authorities.	This is a general measure affecting all authorisations and certifications. Ensuring mutual recognition of safety certificates should have a high impact. Significant benefits from mutual recognition of vehicle authorisation not likely to be realised without implementation of other measures.	Low (authorisations and 1 st country certification) High (additional country certification)	2017	2017-2025 2020-2025 (mutual recognition of authorisations)
2.1.B: Enhanced “coordination” and supervision role of ERA with respect to Notified Bodies regarding: type approval; rail vehicles certification; ERTMS certification and accreditation of NoBos.	This is likely to particularly impact additional authorisations by giving additional countries confidence in NoBo outputs. Will also particularly impact vehicle authorisations involving ERTMS sub-systems	Medium	2017	2017-2020
2.1.6: Control by ERA over the functioning of NSAs (for example by developing guidelines and auditing adherence to them).	This is a general measure affecting all authorisations and certifications	Low	2017	2017-2022
Complete Option	The impact of this option is relatively low with additional powers of the Agency limited. Main impact is on additional authorisations.	Low	2017	2017-2022

Option 3: ERA as a one-stop shop

Analysis of the impact of measures included in Option 3 is set out in Appendix Table D.12. The analysis builds on the qualitative analysis set out Chapter 5 of the main report.

APPENDIX TABLE D.12 IMPACT ANALYSIS OF OPTION 3 MEASURES

Measure	Key impact characteristics (as prompted by question list)	Impact magnitude (low/medium/high)	Measure in place	Likely phasing of main impact
2.1.1a: Migration to a single (common) safety certificate: national authorities issue single safety certificates (mutually recognised by definition)	The key impact of the single safety certificate is the eventual removal of the need for additional Part B authorisations.	High	2017	2017-2021
2.2.B: ERA shares the competences with the NSAs regarding granting of safety certificates to the railway undertakings and vehicle authorisations placing into service (a "one stop shop" for safety certificates and vehicle authorisation concept): the decision is taken by the NSA, ERA performs "entry and exit" checks of the application and of the decision.	This is a general measure affecting all authorisations and certifications	Medium	2017	2017-2021
2.3: ERA as an appeal body for some decisions of NSAs	Likely to impact all authorisations & certifications. Assume that prospect of appeal has immediate effect on NSA behaviour. However, impact is likely to decrease with reduction in open points and national rules.	Medium	2017	2017-2019
2.1.B: Enhanced "coordination" and supervision role of ERA with respect to NoBos regarding: type approval; rail vehicles certification; ERTMS certification & accreditation of NoBos.	This is likely to particularly impact additional authorisations by giving additional countries confidence in NoBo outputs. Will also particularly impact vehicle authorisations involving ERTMS sub-systems	Medium	2017	2017-2020
2.1.6: Control by ERA over the functioning of NSAs (e.g. by developing guidelines & auditing adherence to them).	This is a general measure affecting all authorisations and certifications	Low	2017	2017-2022
4.9a: Migration to a single vehicle authorisation (setting up European "passport" for vehicles): national authorities issue single vehicle authorisations (mutually recognised by definition)	Impacts should be felt across all authorisation categories but mainly additional authorisations. Full benefits not likely to be realised without implementation of other measures e.g. improved infrastructure registers.	Low	2020	2020-2025
Complete Option	Whilst ERA has more powers in this option primarily through measure 2.2.B it is likely that additional benefits over option 2 will be limited with division of labour between NSAs and the Agency being an issue.	Low/Medium	2017	2017-2022

Option 4: ERA and NSAs share competencies

Analysis of the impact of measures included in Option 4 is set out in Appendix Table D.13. The analysis builds on the qualitative analysis set out in Chapter 5 of

the main report. Measure 2.1.1 (Migration to a single safety certificate) is included in this option since whilst this measure is in all the options, in this option it is introduced earlier due to the additional powers of the Agency.

APPENDIX TABLE D.13 IMPACT ANALYSIS OF OPTION 4 MEASURES

Measure	Key impact characteristics (as prompted by question list)	Impact magnitude (low/medium/high)	Measure in place	Likely phasing of main impact
2.2.Z: ERA shares the competences with the NSAs regarding granting of safety certificates to RUs & vehicle authorisations to applicants: a "one stop shop" concept with the NSAs (acting as regional offices of ERA) contributing in the process but the final decision rests with ERA.	This is a general measure affecting all authorisations and certifications.	High	2017	2017-2022
2.1.1b: Migration to a single (common) safety certificate: ERA issues single safety certificates	The key impact of the single safety certificate is the eventual removal of the need for additional Part B authorisations.	High	2018	2018-2023
2.1.B: Enhanced "coordination" and supervision role of ERA with respect to NoBos regarding: type approval; rail vehicles certification; ERTMS certification and accreditation of NoBos.	This is likely to particularly impact additional authorisations by giving additional countries confidence in NoBo outputs. Will also particularly impact vehicle authorisations involving ERTMS sub-systems	Medium	2017	2017-2020
4.9b: Migration to a single vehicle authorisation (setting up European "passport" for vehicles): ERA issues single vehicle authorisations	Impacts should be felt across all authorisation categories but mainly additional authorisations. Full benefits not likely to be realised without implementation of other measures e.g. improved infrastructure registers.	Medium	2020	2020-2025
Complete Option	Provided ERA has sufficient powers to act as a strong central office this option is likely to have a significant impact on authorisation and certification costs and timescales.	Medium/High	2017	2017-2023

Option 5: ERA takes over activities of NSAs regarding authorisation & certification

Analysis of the impact of measures included in Option 5 is set out in Appendix Table D.14. The analysis builds on the qualitative analysis set out in Chapter 5 of the main report. Measure 2.1.1 (Migration to a single safety certificate) is included in this option since whilst this measure is in the base, in this option it is introduced earlier due to the additional powers of the Agency.

APPENDIX TABLE D.14 IMPACT ANALYSIS OF OPTION 5 MEASURES

Measure	Key impact characteristics (as prompted by question list)	Impact magnitude (low/medium/high)	Measure in place	Likely phasing of main impact
2.2.C: ERA takes over the competences of the NSAs regarding granting of certificates to RUs & vehicle authorisations	This is a general measure affecting all authorisations and certifications.	High	2017	2017-2023 Measure will take some time to bed in
2.1.1b: Migration to a single (common) safety certificate: ERA issues single safety certificates	The key impact of the single safety certificate is the eventual removal of the need for additional Part B authorisations.	High	2017	2017-2022
2.1.B: Enhanced “coordination” and supervision role of ERA with respect to Notified Bodies regarding: type approval; rail vehicles certification; ERTMS certification and accreditation of NoBos.	This is likely to particularly impact additional authorisations by giving additional countries confidence in NoBo outputs. Will also particularly impact vehicle authorisations involving ERTMS sub-systems	Medium	2017	2017-2020
4.9b: Migration to a single vehicle authorisation (setting up European “passport” for vehicles): ERA issues single vehicle authorisations	Impacts should be felt across all authorisation categories but mainly additional authorisations. Full benefits not likely to be realised without implementation of other measures e.g. improved infrastructure registers.	Medium	2020	2020-2025
Complete Option	This option would have a high impact on authorisation costs and timescales and	High	2017	2017-2023

	would also enable additional efficiencies over the current arrangements through economies of scale.			
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Option 6: horizontal measures (independent of the level of interaction ERA/national authorities)

Analysis of the impact of measures included in Option 6 is set out in Appendix Table D.15. The impact of many of these measures is affected by the scope of any extension of the powers of the Agency. Currently we have constructed the impacts based on the implementation of these measures incremental to the baseline scenario.

APPENDIX TABLE D.15 IMPACT ANALYSIS OF OPTION 6 MEASURES

Measure	Key impact characteristics (as prompted by question list)	Impact magnitude (low/medium/high)	Measure in place	Likely phasing of main impact
3.1: Strengthened action by the Commission in implementing the legislation	This will impact all authorisations and certifications. Impact will be greatest in 'challenging' countries.	Medium	2015	2015-2018
3.3: Amendment of the railway directives to enable the adoption by the Commission of implementing measures setting out common principles & practices for the national authorities	Impacts should be felt across all authorisation and certification categories. Impact will be most significant in 'challenging' countries	Medium	2017	2017-2022
4.1.1: Enhanced role of ERA in monitoring & control of implementation of national safety & interoperability legislation	Impacts should be felt across all authorisation and certification categories. Impact will be most significant in 'challenging' countries.	Low	2016	2016-2018
4.1.2: Migrating from national technical & safety rules to EU rules through clear indication of what national rules need to be removed by national authorities with the national authorities tasked with the role of removing them. Also modify the directive with a view to limit/remove the possibility for MS to adopt new national rules	Impacts should be felt across all authorisation categories although particularly for additional authorisations. We have assumed that this measure does have an impact on the number of national rules in existence at the end of the evaluation period, not just a speeding up of the process of removal.	Medium	2015	2015-2020
4.2: Enhanced role of ERA in dissemination of railway-related information and training.	Impacts should be felt across all authorisation and certification categories.	Low	2015	2015-2017
4.3: Enhanced role of ERA in providing advice and support for Member States and other stakeholders in implementing EU legislation on safety & interoperability	Impacts should be felt across all authorisation and certification categories.	Medium	2015	2015-2018
4.6: Communication from the Commission regarding guidelines on the interpretation of specific EU laws & decisions (including TSIs)	Impacts should be felt across all authorisation and certification categories. Impact will be most significant in 'challenging' countries.	Medium	2015	2016-2018

Measure	Key impact characteristics (as prompted by question list)	Impact magnitude (low/medium/high)	Measure in place	Likely phasing of main impact
4.7: Enhanced role of ERA in identifying potential spare parts to be standardised and coordination of industry activities in this area	Impact of spare parts component evaluated qualitatively - see Maintenance costs indicator.	Low	2016	2016-2025
Complete Option	This option contains some measures that can be implemented relatively quickly and as such has an earlier benefit than any other option. However, most of the measures have a medium or low impact and therefore the overall impact is similar to options 2 and 3.	Medium	2015	2015-2025

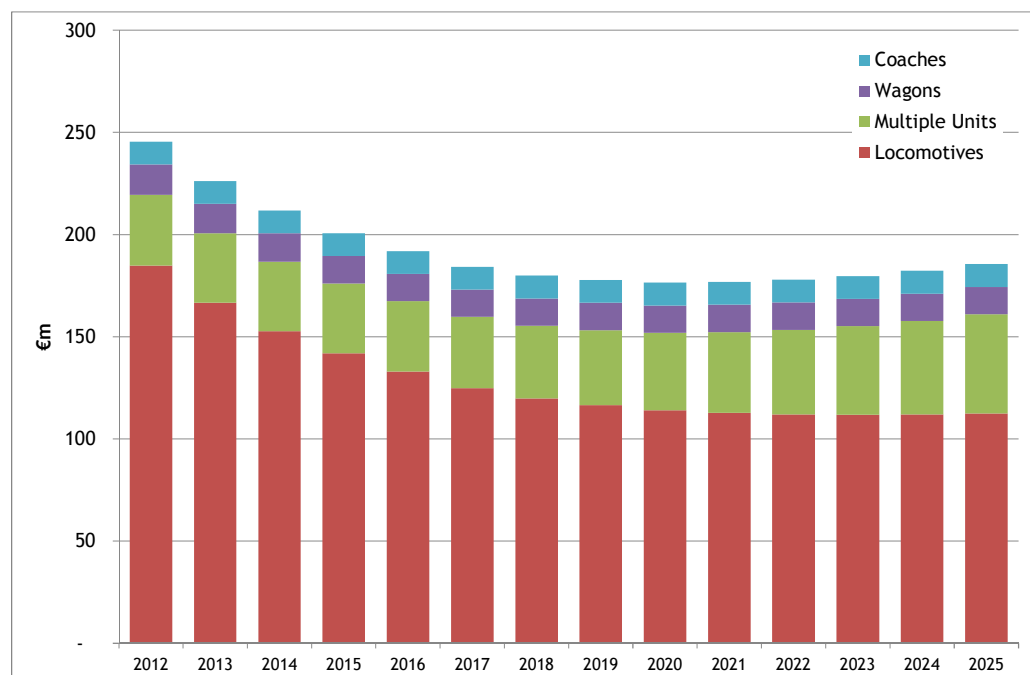
2 Quantitative Impact Assessment results

Baseline

The forecast evolution of total authorisation costs in the baseline scenario between 2012 and 2025 is shown in Appendix Figure D.4. This shows that in the baseline, even without major extensions of the Agency’s role, total authorisation costs are anticipated to fall by over a third by 2020 as Cross-Acceptance, reduction of National Rules, TSI scope extension and other measures impact authorisation costs. The total level of authorisation costs does however, demonstrate the scope for cost savings with estimated total authorisation costs of over a quarter of a billion euros in 2012. The increase in authorisation costs post 2020 is caused by growth in ERTMS deployment creating a higher volume of (expensive) ERTMS related vehicle authorisations. This is an area of considerable uncertainty in the total level of authorisation costs but the impact on the incremental option benefits is small.

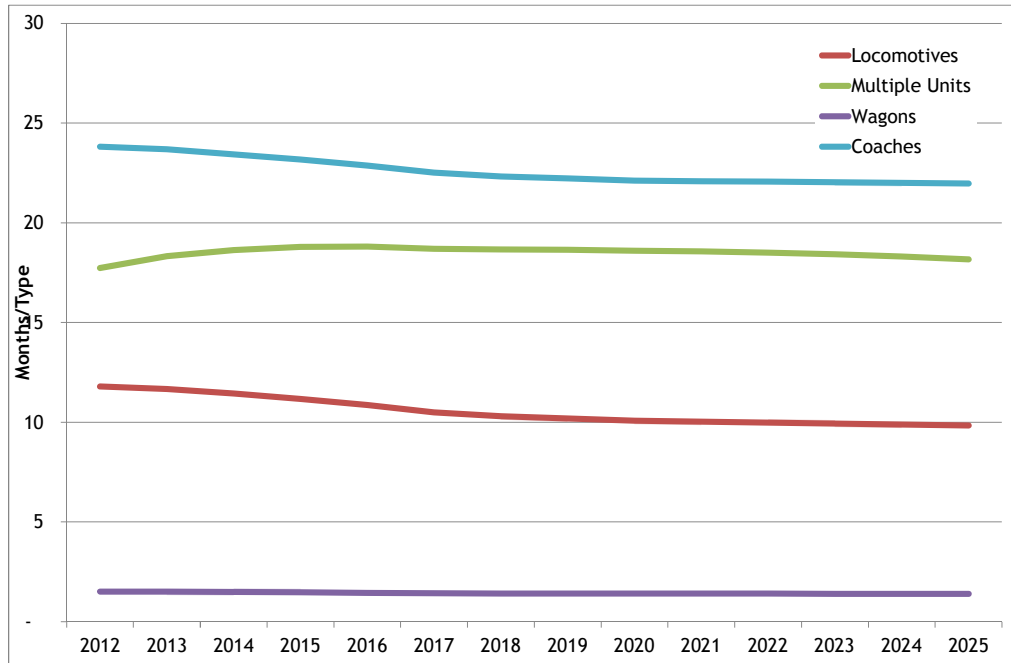
The main external reference point for the quantitative outputs in this study is the Agency’s evaluation of the benefits of TSI Scope extension. A direct comparison of absolute authorisation costs is difficult since the Agency’s analysis (which deals solely with locomotives) includes an estimate of the economic costs of locomotives stored in sidings as well as the direct costs of vehicle authorisation. However, what can be ascertained is that, whilst the Agency has estimated an approximate 50% reduction in authorisation costs (including economic costs of locomotives stored in sidings) by 2020 we have taken a more cautious view, estimating a reduction of around a third by 2020.

APPENDIX FIGURE D.4 FORECAST AUTHORISATION COSTS ALL VEHICLE TYPES 2012-2025 (REAL, UNDISCOUNTED)



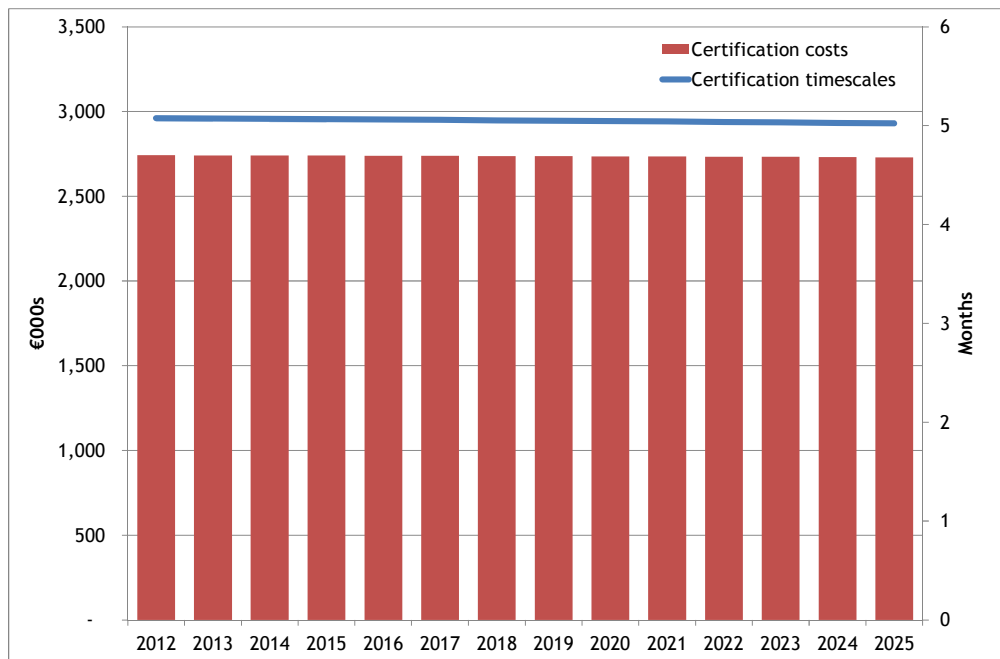
The forecast evolution of average authorisation timescales in the baseline scenario between 2012 and 2025 is shown in the figure below. Consistent with the reduction in costs a reduction in timescales is forecast although not as large as the proportional reduction in costs.

APPENDIX FIGURE D.5 FORECAST AUTHORISATION TIMESCALES 2012-2025



In the baseline certification costs and timescales are forecast to remain virtually constant with little improvement as illustrated in the figure Appendix Figure D.6.

APPENDIX FIGURE D.6 FORECAST CERTIFICATION COSTS 2012-2025 (REAL, UNDISCOUNTED)



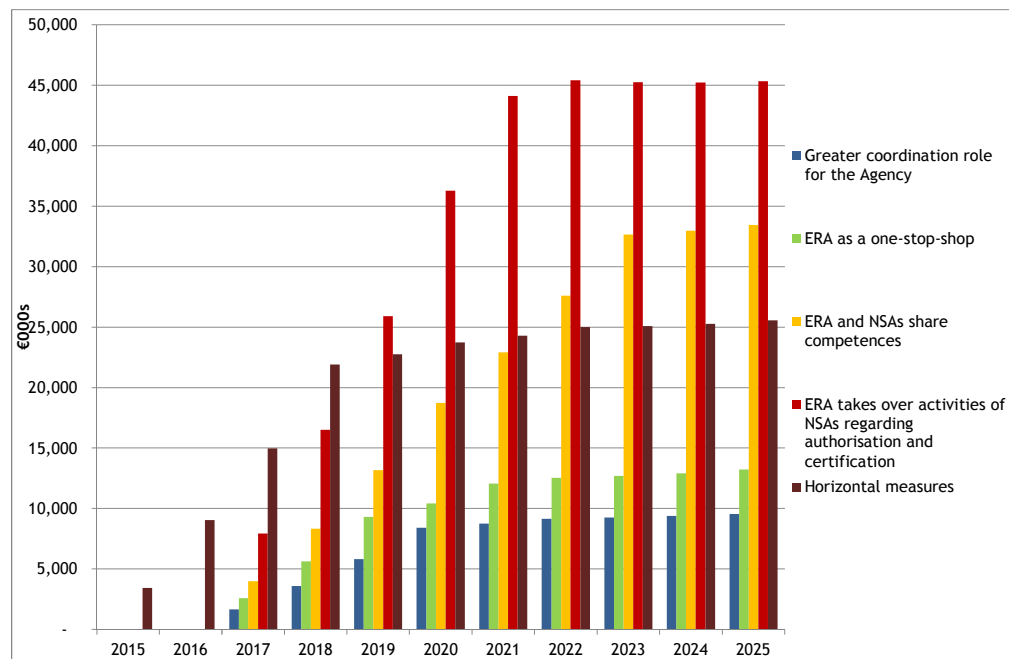
Option results incremental on the baseline

Discounted savings for authorisation costs are shown in Appendix Table D.16. The evolution of these cost savings over time is shown in Appendix Figure D.7.

APPENDIX TABLE D.16 DISCOUNTED AUTHORISATION COST SAVINGS

Option	Discounted savings in authorisation costs 2015-2025 (€m NPV)
Option 2: Further ERA “Coordination”	45
Option 3: ERA as One-Stop-Shop	62
Option 4: ERA and NSAs share competences	130
Option 5: ERA takes over activities of NSAs regarding authorisation and certification	212
Option 6: horizontal measures (independent of the level of interaction ERA/national authorities)	156

APPENDIX FIGURE D.7 TOTAL AUTHORISATION COST SAVINGS 2015-2025 (REAL, UNDISCOUNTED)

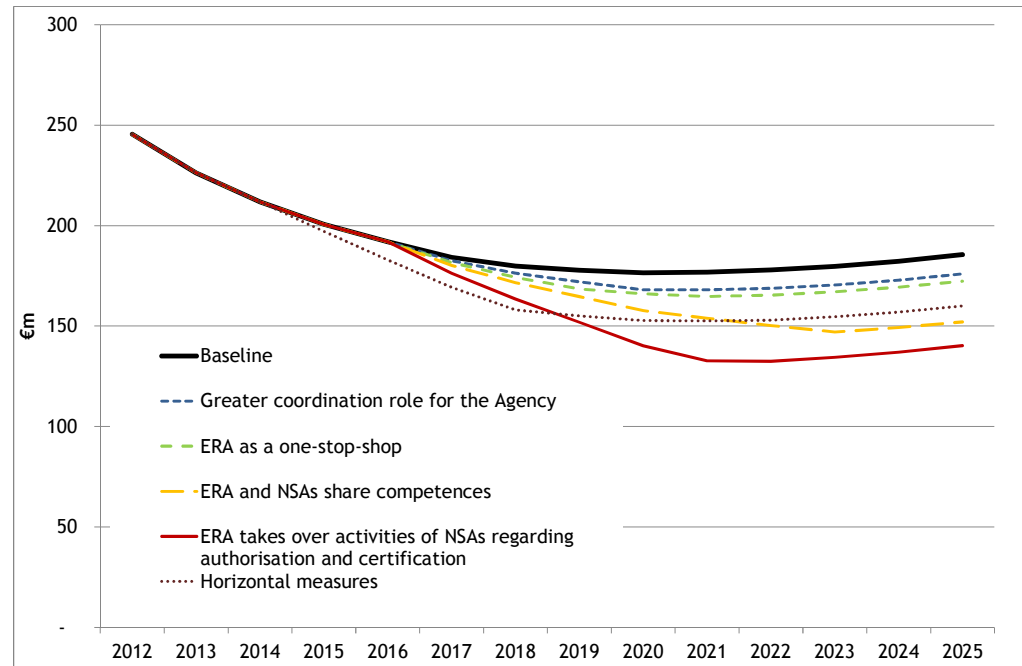


Consistent with the qualitative analysis, option 5 is significantly more effective in reducing authorisation costs than other options with efficiencies being gained in this option that can only be achieved through complete centralisation. Option 6 has a significantly earlier impact than the other options, again consistent with the

qualitative analysis and reflecting measures that can be put in place relatively quickly.

The path of total authorisation costs relative to the baseline is illustrated in the figure Appendix Figure D.8. This shows clearly that although Option 3 has nearly 40% more benefit than Option 2, relative to the other options the difference between these two options is actually quite small.

APPENDIX FIGURE D.8 TOTAL AUTHORISATION COSTS BY OPTION 2012-2025 (REAL, UNDISCOUNTED)



One of the potentially surprising features of the results is the significantly larger impact of option 6 compared to options 2 and 3. In NPV terms the horizontal option is more than three times as beneficial as option 2 and more than twice as beneficial as option 3. There are a number of reasons for this:

- I Early start of measures** - In the horizontal option a majority of the measures can be implemented by 2015. A significant element of the much higher NPV value of benefits for option 6 is due to the early introduction of measures compared to options 2 and 3 where no measures are implemented before 2017.
- I Large number of measures in the horizontal option with medium impact** - six measures in the horizontal option are classified as having a medium impact. Whilst there is some overlap between the individual measures which has been captured in the analysis, the combination of a large number of medium impact measures is a substantial impact. In particular there are three measures which strengthen the legal basis of authorisation and certification through a clearer legal framework (measures 3.3 and 4.6) and a stronger enforcement regime (measure 3.1). Taken together, these measures provide a solid basis for a substantive reduction in authorisation and certification costs.

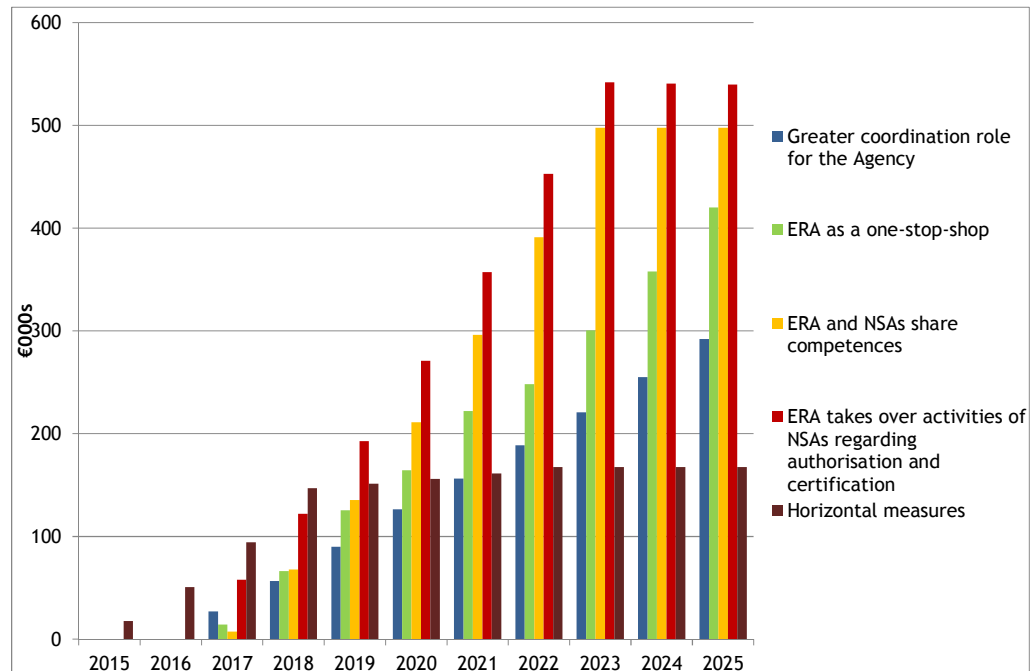
- I Limited ‘teeth’ of option 2 and 3 measures resulting in low impacts for many measures** - whilst the horizontal option has a number of relatively strong measures, option 2 and 3 measures generally lack the teeth to be particularly effective without full NSA cooperation. For example, in option 3 ‘entry and exit’ checks for certification and authorisation decisions and auditing of adherence to guidelines will only be effective in the sense of applying ‘peer’ pressure on NSAs. There is no legal compulsion attached. This is in contrast to the horizontal options where a number of the measures provide a direct legal basis for challenge of NSA actions. Measure 2.3 in option 3 does allow the Agency to act as an appeal body but the available evidence has pointed to an extreme reluctance on the part of RUs to appeal against NSA decisions. In addition the impact of this measure is forecast to reduce as the number of open points and national rules decreases.

Discounted savings for certification costs are shown in Appendix Table D.17. Total certification cost savings over the evaluation period are shown in Appendix Figure D.9.

APPENDIX TABLE D.17 DISCOUNTED CERTIFICATION COST SAVINGS (EXCLUDING FEES)

Option	Discounted savings in certification costs 2015-2025 (€m NPV)
Option 2: Further ERA “Coordination”	0.9
Option 3: ERA as One-Stop-Shop	1.3
Option 4: ERA and NSAs share competences	1.7
Option 5: ERA takes over activities of NSAs regarding authorisation and certification	2.0
Option 6: horizontal measures (independent of the level of interaction ERA/national authorities)	1.1

**APPENDIX FIGURE D.9 TOTAL CERTIFICATION COST SAVINGS 2015-2025
(EXCLUDING FEES REAL, UNDISCOUNTED)**



The picture for certification costs is slightly different to authorisation costs with less differentials between Options 3 and 4. Also the benefits of the horizontal measures option are significantly smaller than those for Options 3-5. The key difference, between the authorisation and certification cost savings is, however, that the certification savings are much smaller, reflecting both a lower volume of certifications relative to authorisations and lower costs per certification compared with authorisation.

Results of combining option 6 with options 2 to 5

In addition to the analysis of the individual policy options we have created a further set of policy options by combining the impacts of the horizontal policy option measures with the impacts of the other policy options. This has been done as Option 6 cannot realistically act as a stand-alone option and would only really work effectively when it is linked to the previous options.

This analysis is not a simple addition of the options as the horizontal measures have a different impact on Options 2 to 5. In Appendix Table D.18 we have set out the level of impact from the horizontal option measures when combined with options 2 to 5. Where the impact is the same for the combined option as for the stand-alone horizontal option this is denoted by '100%'. Where it is less a correspondingly smaller percentage is included. The key feature is that a number of horizontal measures have a smaller impact in options 4 and 5 since the core measures for these options negate the need for some of the horizontal measures. In the impact assessment calculator option level adjustments have also been included to keep the combined effects to a feasible level (i.e. reduction of gap between average and 'perfect' authorisation/certification cannot be more than 100%).

The matrix in Appendix Table D.18 represents a fairly high level approach to the amalgamation of the horizontal measures. Together with some simplifications with the phasing of impacts this means that these results should be used with appropriate caution.

APPENDIX TABLE D.18 HORIZONTAL MEASURES IMPACTS MATRIX

Option	Horizontal option measure								
	3.1	3.2	3.3	4.1.1	4.1.2	4.2	4.3	4.6	4.7
Option 2	100%	75% (authorisation) 90% (certification)	100%	100%	100%	100%	100%	100%	100%
Option 3	100%	75%	100% 50% (additional country certification)	75%	100%	100%	100%	75%	100%
Option 4	25%	50%	50%	50%	100%	100%	75%	50%	100%
Option 5	0%	25%	0%	25%	100%	75%	50%	25%	100%

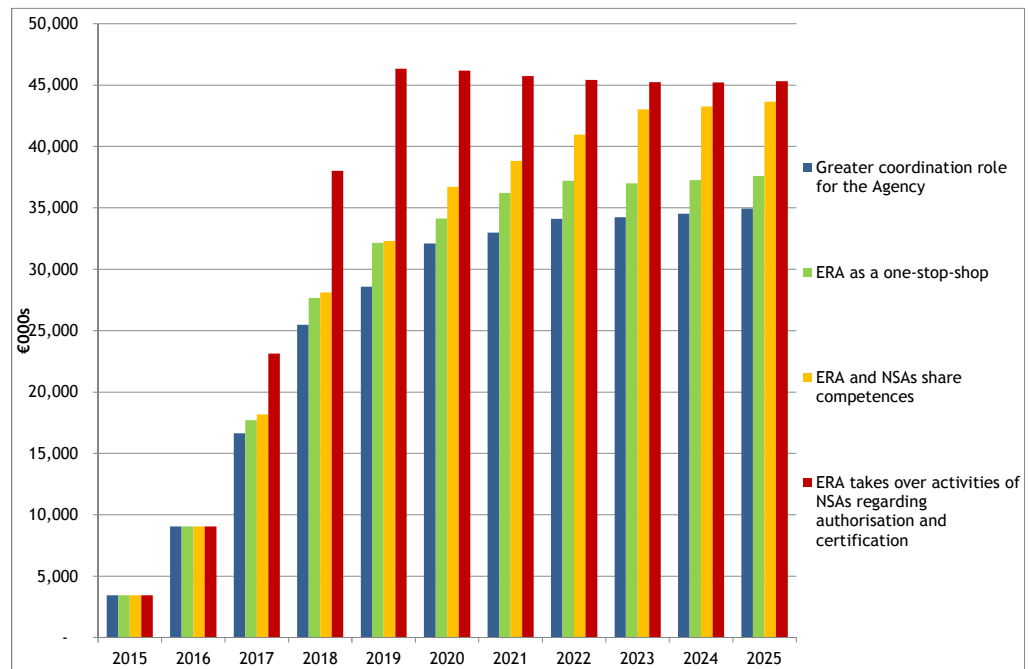
Note: percentages reflect the relative impact of measures when combined with options 2-5 compared to impact in option 6. I.e. if impact of measure in option 6 is 10% and percentage in table is 50% this implies a 5% impact.

Discounted savings for authorisation costs are shown in Appendix Table D.19. The evolution of these cost savings over time is shown in Appendix Figure D.10. A key point is that with the addition of the horizontal measures, the gap between the options narrows significantly.

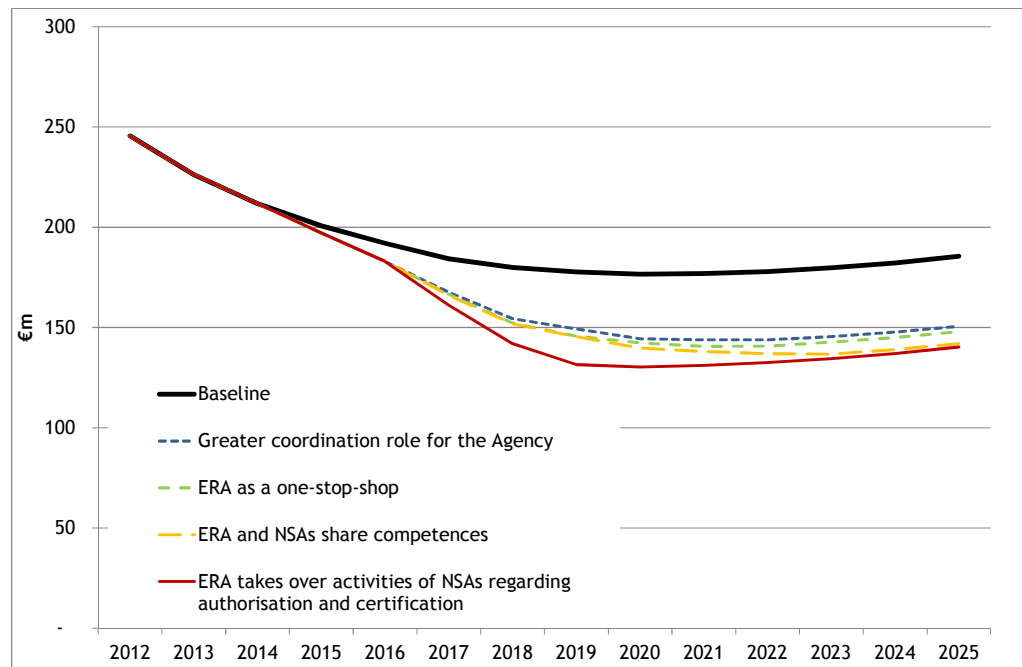
APPENDIX TABLE D.19 DISCOUNTED AUTHORISATION COST SAVINGS WITH HORIZONTAL MEASURES INCLUDED IN OPTIONS

Option	Discounted savings in authorisation costs 2015-2025 (€m NPV)
Option 2: Further ERA "Coordination"	201
Option 3: ERA as One-Stop-Shop	217
Option 4: ERA and NSAs share competences	235
Option 5: ERA takes over activities of NSAs regarding authorisation and certification	276

APPENDIX FIGURE D.10 TOTAL AUTHORISATION COST SAVINGS 2015-2025 WITH HORIZONTAL OPTION COMBINED WITH OPTIONS 2 - 5 (REAL, UNDISCOUNTED)



APPENDIX FIGURE D.11 TOTAL AUTHORISATION COSTS BY OPTION 2012-2025 WITH COMBINED OPTIONS (REAL, UNDISCOUNTED)



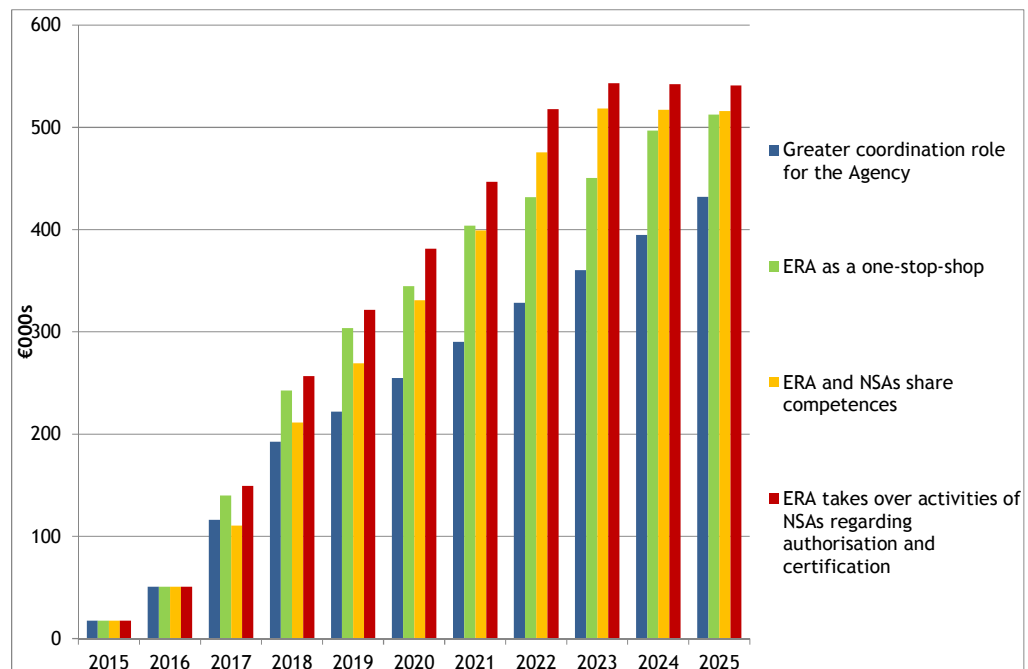
This figure confirms that the incremental options have a significant impact on the cost of authorisation with Options 4 and 5 reaching at least a 20% improvement over the baseline.

Discounted savings for certification costs are shown in the table below. Total certification cost savings over the evaluation period are shown in Appendix Figure D.12. The difference between options 4 and 5 narrows less than for authorisation costs, due partly to the dominating influence of bringing forward the impacts of the single safety certificate in options 4 and 5. However, options 3 and 4 now have a virtually identical level of benefit.

APPENDIX TABLE D.20 DISCOUNTED CERTIFICATION COST SAVINGS (EXCLUDING FEES) WITH HORIZONTAL MEASURES OPTION COMBINED WITH OPTIONS 2 - 5

Option	Discounted savings in authorisation costs 2015-2025 (€m NPV)
Option 2: Further ERA “Coordination”	1.8
Option 3: ERA as One-Stop-Shop	2.3
Option 4: ERA and NSAs share competences	2.3
Option 5: ERA takes over activities of NSAs regarding authorisation and certification	2.6

APPENDIX FIGURE D.12 TOTAL CERTIFICATION COST SAVINGS 2015-2025 (EXCLUDING FEES) WITH HORIZONTAL MEASURES OPTION COMBINED WITH OPTIONS 2 - 5 (REAL, UNDISCOUNTED)



In Appendix D we set out the direct impacts of the options disaggregated to show the differing impacts on 1st and additional authorisation/certifications and also the

relative size of the impact on the passenger and freight markets. The results shown in the appendix are the results for the combined options.

Opportunity cost savings from reduced authorisation timescales

There will be a number of savings arising directly from shorter rolling stock authorisation timescales. These include:

- Reduction in operating costs accrued as a result of needing to cover delayed stock with alternative stock
- Reduction in loss of revenue where the introduction of new services is delayed/existing services are cut back where rolling stock is not available to cover for delayed stock
- Reduced storage costs

Whilst the impacts are significant, quantification is challenging. For example, the balance of cost savings versus reductions in lost revenue is highly dependent on the precise nature of services involved. Further, the magnitude of cost savings and reductions in revenue loss will also be dependent on a number of other factors. For example, an incumbent might be able to cover affected services with existing rolling stock and therefore only incur storage costs, but a new entrant might forgo significant revenue if it is unable to obtain covering rolling stock.

We have therefore developed three scenarios to construct an assessment of the possible range of opportunity cost savings. The scenarios are:

- i) All affected services are covered by alternative rolling stock (lower bound)
- ii) Half of affected freight services and half of affected passenger services are not able to run with resultant revenue loss (central case)
- iii) None of the affected services are able to run (upper bound)

The detailed derivation of assumptions and methodology used to construct the estimates for each scenario are covered in the appendix D. The key parameters however, are:

- Cost of alternative rolling stock is assumed to be cost of leasing additional rolling stock. For locomotives a value of approx. €30k per month has been used and for multiple unit vehicles, €15k. Both these values are approximately 1% of typical average new vehicle values
- Using UIC data, average revenue per loco and passenger vehicle have been calculated as a percentage of new vehicle value. For locomotives this is 3.8% on a monthly basis and for passenger vehicles 1.9% on a monthly basis

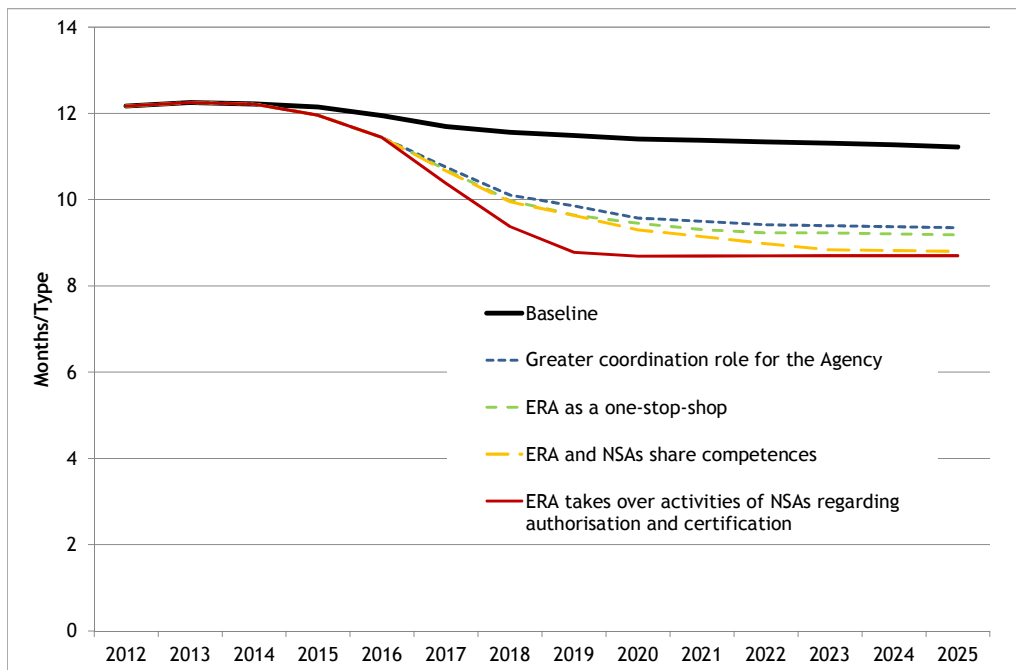
Using these parameters together with the current value of delayed rolling stock in sidings derived from data collected by the Agency it has been possible to construct estimates of the savings arising from reduced authorisation timescales. We have assumed that reductions in authorisation timescales are reflected one for one in reductions in average delays¹⁰. Reductions in certification timescales have not

¹⁰ Alternative assumptions could have been employed e.g. it might be anticipated that the cases in question represent the 'hard cases' that would be impacted more than average by

been included in the delay reduction since evidence suggests it is vehicle authorisation that is the primary binding constraint.

Average reductions in authorisation timescales by option are shown in Appendix Figure D.13. Note that the average reduction in timescales shown in Appendix Figure D.13 will not correspond exactly with the total opportunity cost reductions shown in Appendix Table D.21 since it is calculated as a weighted average of all authorisations, not just authorisations of vehicles in sidings.

APPENDIX FIGURE D.13 AVERAGE REDUCTION IN AUTHORISATION TIMESCALES BY COMBINED OPTION



The analysis only covers locomotives and multiple units since the Agency have stated that their studies show that coaches and wagons usually achieve their due dates and only have data for locomotives and multiple units. In addition we have not incorporated costs of storage since available data¹¹ suggests that these costs are relatively small compared to the costs of leasing stock or forgone revenue.

Appendix Table D.21 shows the discounted opportunity cost savings that could be achieved over the period 2015 - 2025. The inclusion of the three different scenarios illustrates the large degree of uncertainty but suggests that savings could

measures explicitly targeting ‘challenging’ countries and less than average by other measures. However, given the limited evidence available we have used the simple assumption outlined.

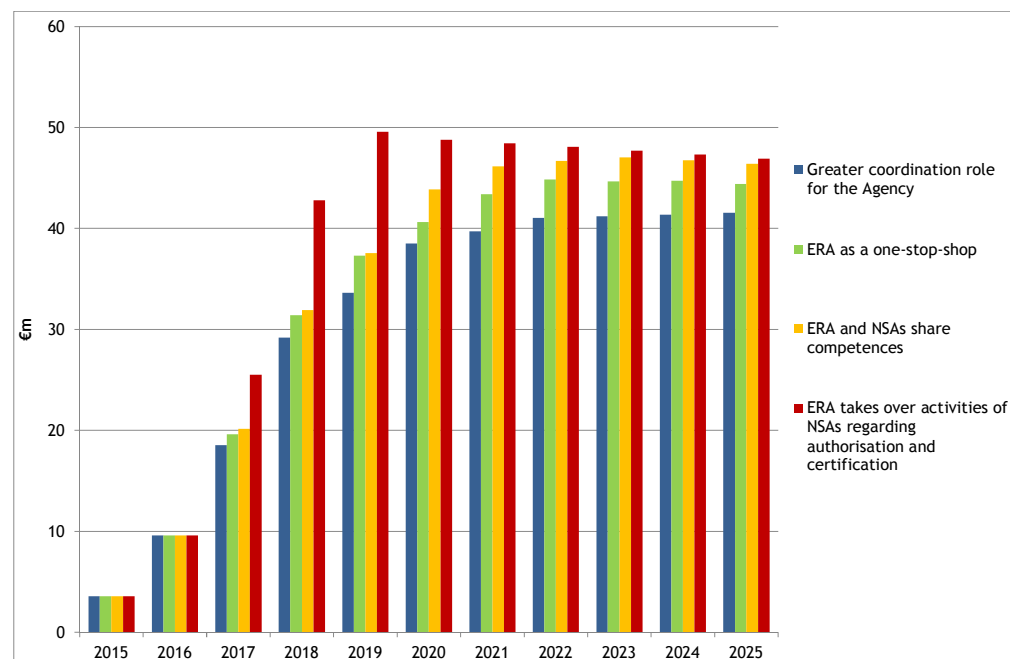
¹¹ Analysis of data from the UK Competition Commission enquiry into rolling leasing companies suggested storage costs of less than €500 a month per vehicle - less than 5% of typical lease costs.

be at least €100m for option 5. Appendix Figure D.14 illustrating savings by year for the central case further shows that savings per option are between €30 and €40m per year by the end of the evaluation period.

APPENDIX TABLE D.21 DISCOUNTED OPPORTUNITY COST SAVINGS 2015-2025 (€M NPV) BY OPTION

Option	Central Case	Lower bound	Upper bound
Option 2: Further ERA “Coordination”	237	71	402
Option 3: ERA as One-Stop-Shop	255	77	433
Option 4: ERA and NSAs share competences	265	81	450
Option 5: ERA takes over activities of NSAs regarding authorisation and certification	295	90	499

APPENDIX FIGURE D.14 TOTAL OPPORTUNITY COST SAVINGS 2015-2025 WITH HORIZONTAL MEASURES OPTION COMBINED WITH OPTIONS 2 - 5 (CENTRAL CASE, REAL, UNDISCOUNTED)



Total Quantified benefits of combined options

Combining the authorisation, certification and opportunity cost savings demonstrates substantial benefits over the evaluation period with benefits of over

€0.5bn for options 3-5 even in discounted terms. Note that for these calculations we have used the central case numbers for the opportunity cost savings for reduced volumes of delayed rolling stock. Total quantified benefits by option are presented in the table Appendix Table D.22.

APPENDIX TABLE D.22 TOTAL QUANTIFIED BENEFITS 2015-2025 (REAL, DISCOUNTED)

Option	Total quantified benefits (€m NPV)
Option 2: Further ERA “Coordination”	439
Option 3: ERA as One-Stop-Shop	474
Option 4: ERA and NSAs share competences	503
Option 5: ERA takes over activities of NSAs regarding authorisation and certification	574

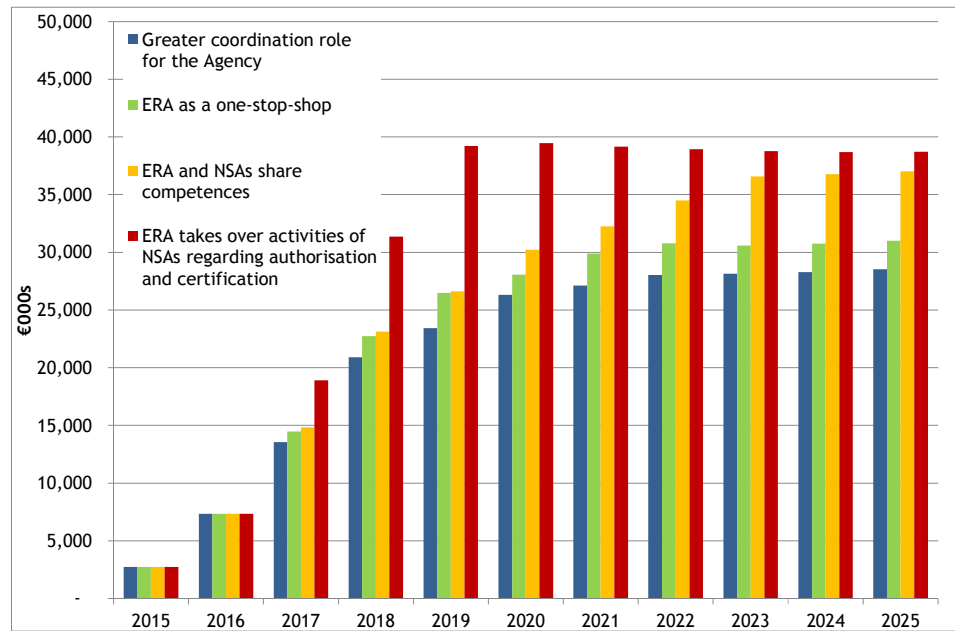
Disaggregated results

In this section we set out the direct impacts of the options disaggregated to show the differing impacts on 1st and additional authorisation/certifications and also the relative size of the impact on the passenger and freight markets. The results shown here are the results for the combined options.

Breakdown of results: 1st country authorisation costs

Total 1st country authorisation costs are shown in the figure below with a breakdown for the passenger and freight markets in Appendix Table D.23.

APPENDIX FIGURE D.15 TOTAL 1ST COUNTRY AUTHORISATION COST SAVINGS 2015-2025 (REAL, UNDISCOUNTED)



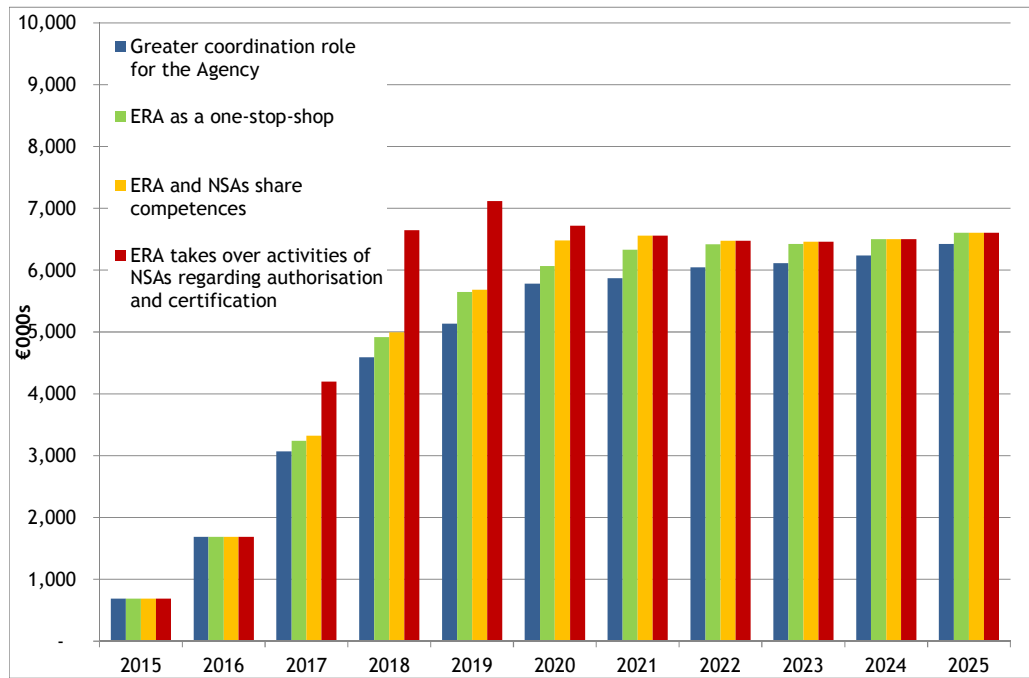
APPENDIX TABLE D.23 1ST COUNTRY AUTHORISATION COSTS - SAVINGS BY OPTION FROM 2015 - 2025 NPV (€M)

Sector	Option 2	Option 3	Option 4	Option 5	Option 6
Passenger	77	84	92	110	61
Freight	87	95	104	124	69

Breakdown of results: Additional country authorisation costs

Total additional country authorisation costs are shown in Appendix Figure D.16 with a breakdown for the passenger and freight markets in Appendix Table D.24.

APPENDIX FIGURE D.16 TOTAL ADDITIONAL COUNTRY AUTHORISATION COST SAVINGS 2015-2025 (REAL, UNDISCOUNTED)



APPENDIX TABLE D.24 ADDITIONAL COUNTRY AUTHORISATION COSTS - SAVINGS BY OPTION FROM 2015 - 2025 NPV (€M)

Sector	Option 2	Option 3	Option 4	Option 5	Option 6
Passenger	15	15	16	17	10
Freight	22	23	23	25	15

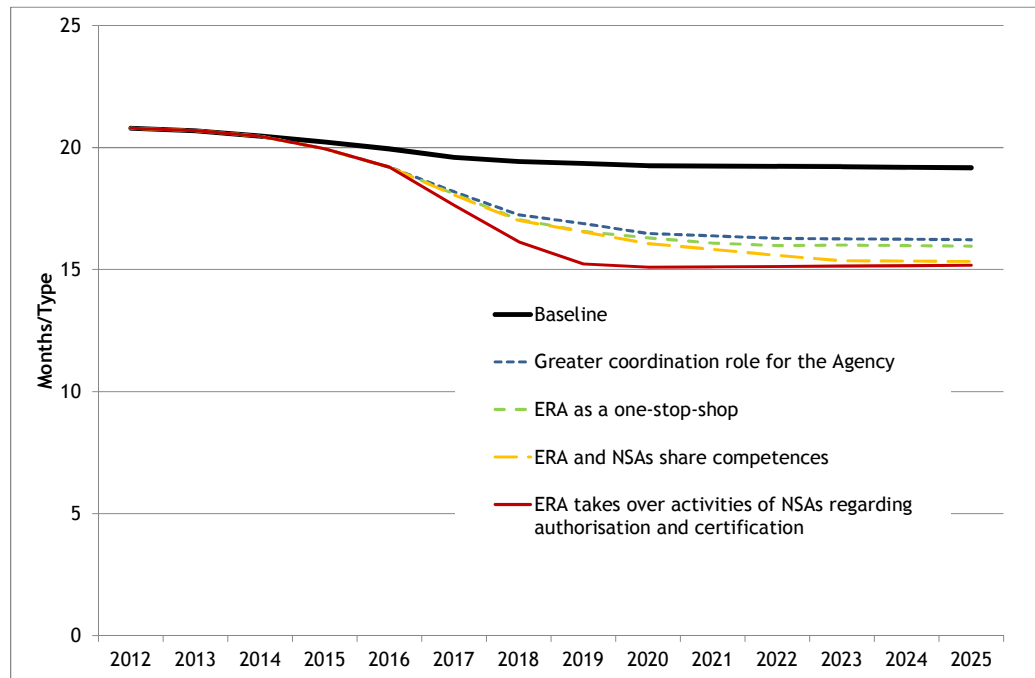
The large share of cost savings accruing to the freight market reflects the high share of authorisation costs accounted for by locomotives which are used primarily by the freight sector¹². The large share of 1st country authorisations reflects the larger number of 1st country authorisations and also, to a lesser extent, more significant savings on some additional country authorisations in the baseline.

Breakdown of results: 1st country authorisation timescales

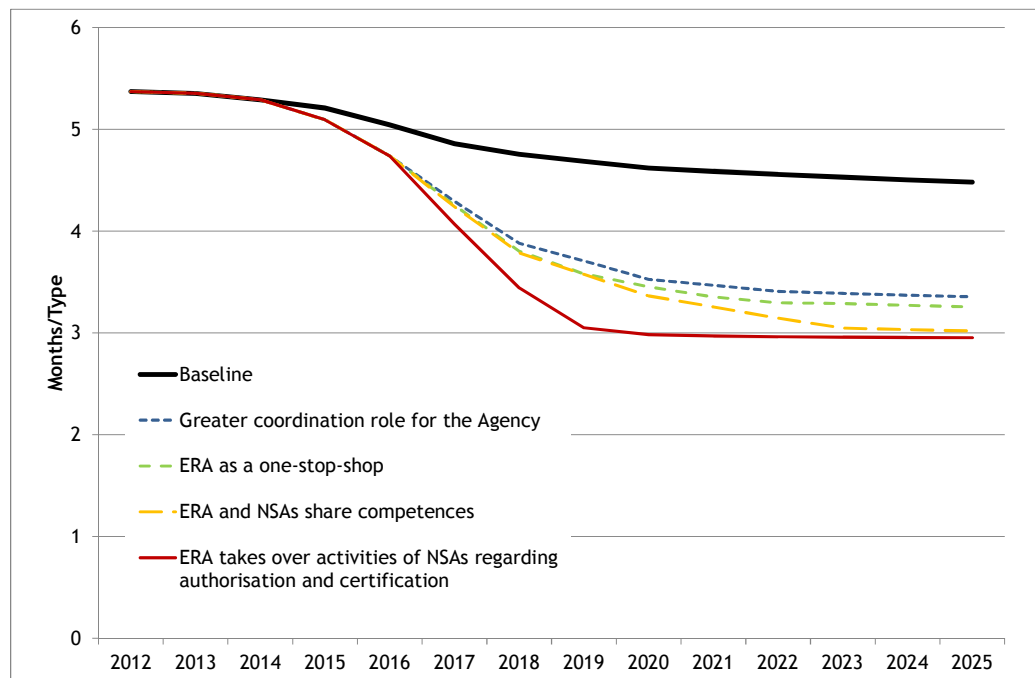
Forecast authorisation timescale trends by option for 1st authorisation are shown in Appendix Figure D.17 (passenger vehicles) and Appendix Figure D.18 (freight vehicles). The reduction is proportionately greater for freight which is heavily influenced by sizeable reductions for locomotives and (proportionately) wagons.

¹² Our analysis suggests that around 60% of locomotives are used primarily for freight rather than passenger purposes.

APPENDIX FIGURE D.17 AVERAGE 1ST AUTHORISATION TIMESCALES FOR PASSENGER VEHICLES BY OPTION (2012-2025)



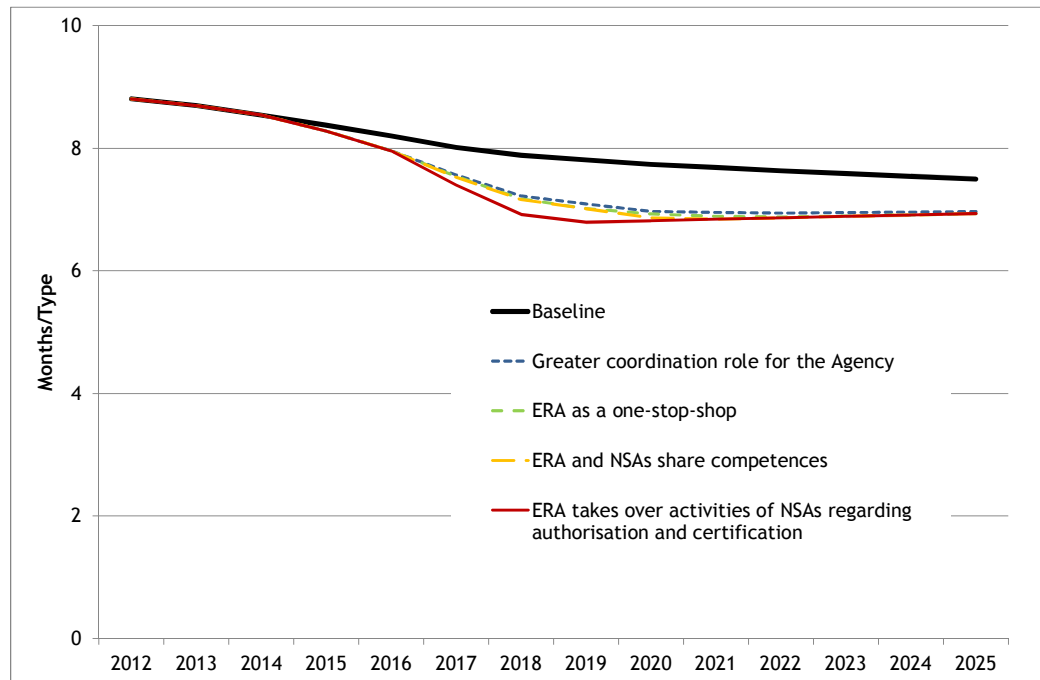
APPENDIX FIGURE D.18 AVERAGE 1ST AUTHORISATION TIMESCALES FOR FREIGHT VEHICLES BY OPTION (2012-2025)



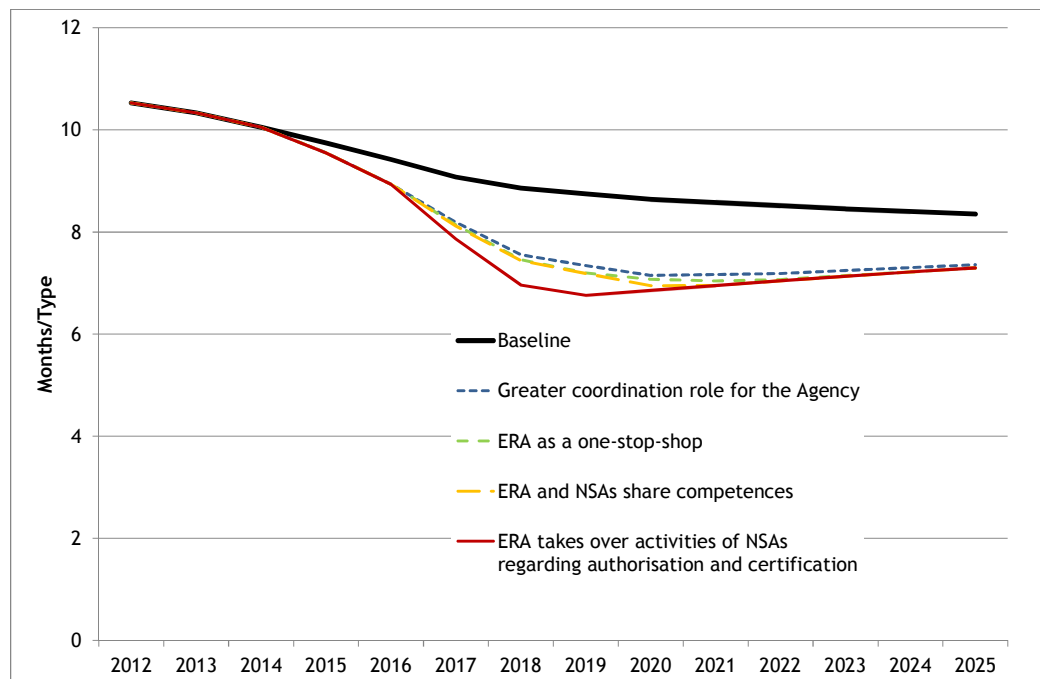
Breakdown of results: Additional country authorisation timescales

Forecast authorisation timescale trends by option for additional authorisation are shown in Appendix Figure D.19 (passenger vehicles) and Appendix Figure D.20 (freight vehicles).

APPENDIX FIGURE D.19 AVERAGE ADDITIONAL AUTHORISATION TIMESCALES FOR PASSENGER VEHICLES BY OPTION (2012-2025)



APPENDIX FIGURE D.20 AVERAGE ADDITIONAL AUTHORISATION TIMESCALES FOR FREIGHT VEHICLES BY OPTION (2012-2025)

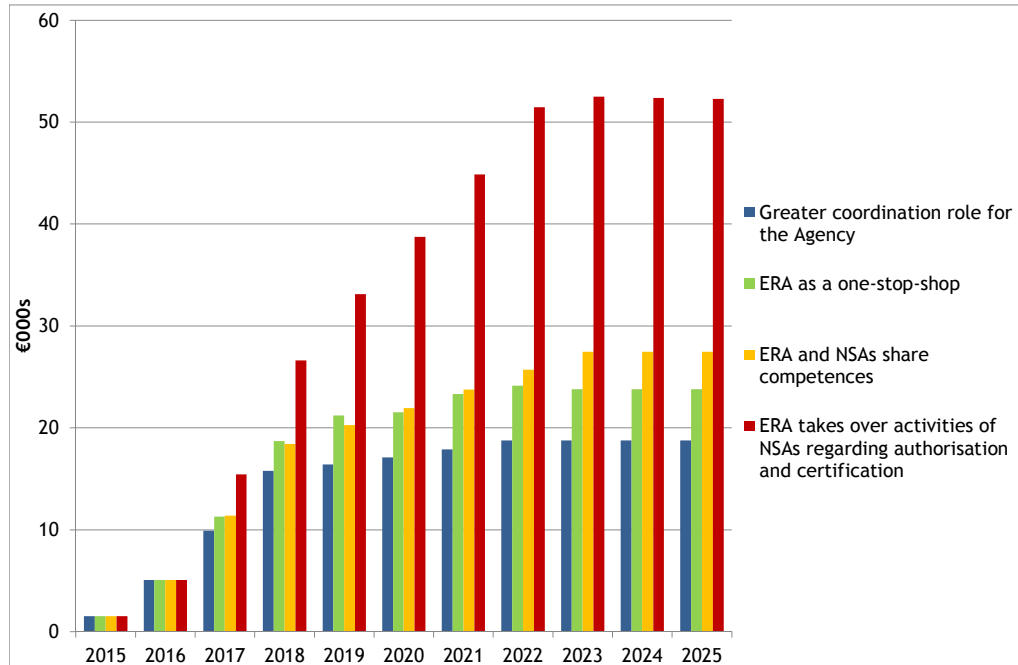


Breakdown of results: 1st country certification costs

Total 1st country certification cost savings are shown in the figure below with a breakdown for the passenger and freight markets in Appendix Table D.25. The savings are very small only reflecting cost reductions in Germany where there is evidence of a costly process currently. The most effective option by a large margin

is option 5, reflecting the benefits of efficient centralisation of certification activities.

APPENDIX FIGURE D.21 TOTAL 1ST COUNTRY CERTIFICATION COST SAVINGS 2015-2025 (REAL, UNDISCOUNTED)



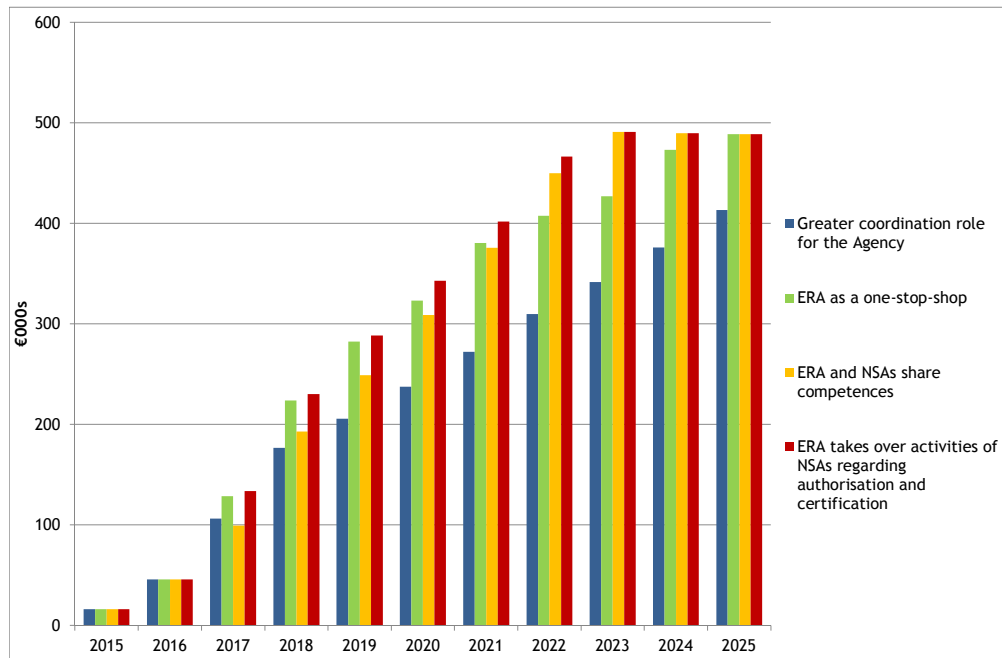
APPENDIX TABLE D.25 1ST COUNTRY CERTIFICATION COSTS - SAVINGS BY OPTION FROM 2015 - 2025 NPV (€M)

Sector	Option 2	Option 3	Option 4	Option 5	Option 6
Passenger	0.04	0.05	0.05	0.09	0.04
Freight	0.07	0.09	0.09	0.16	0.07

Breakdown of results: Additional country certification costs

Total additional country certification costs are shown in Appendix Figure D.22 with a breakdown for the passenger and freight markets in Appendix Table D.26. Benefits are similar for all options although there is a step in benefits between options 2 and 3 reflecting the introduction of a single safety certificate in options 3 to 5.

APPENDIX FIGURE D.22 TOTAL ADDITIONAL COUNTRY CERTIFICATION COST SAVINGS 2015-2025 (REAL, UNDISCOUNTED)



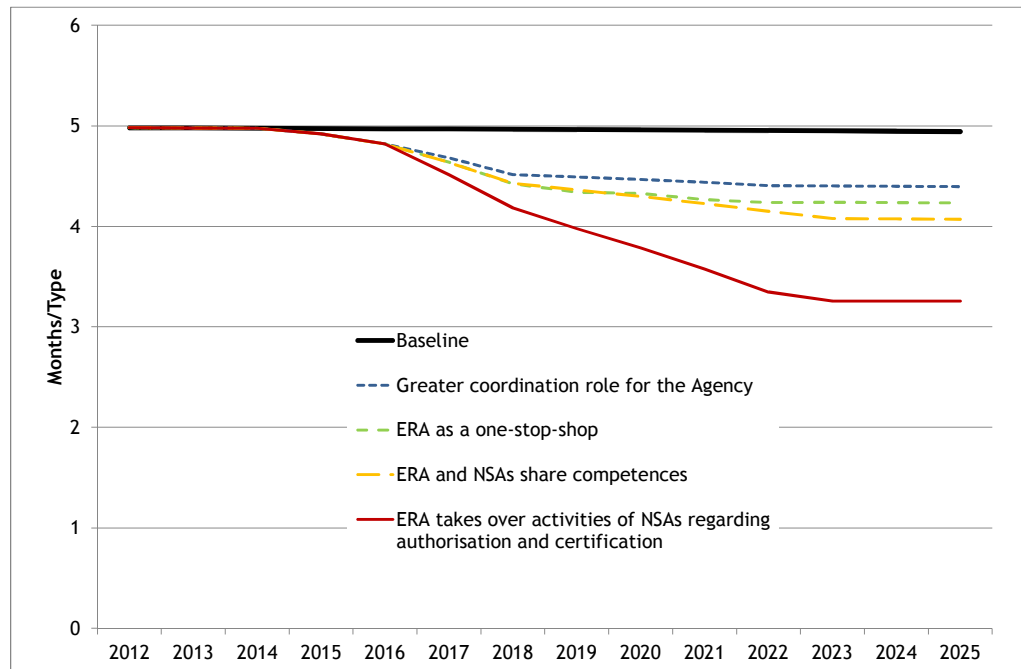
APPENDIX TABLE D.26 ADDITIONAL COUNTRY CERTIFICATION COSTS - SAVINGS BY OPTION FROM 2015 - 2025 NPV (000€)

Sector	Option 2	Option 3	Option 4	Option 5	Option 6
Passenger	0.45	0.58	0.58	0.62	0.24
Freight	1.26	1.62	1.61	1.71	0.68

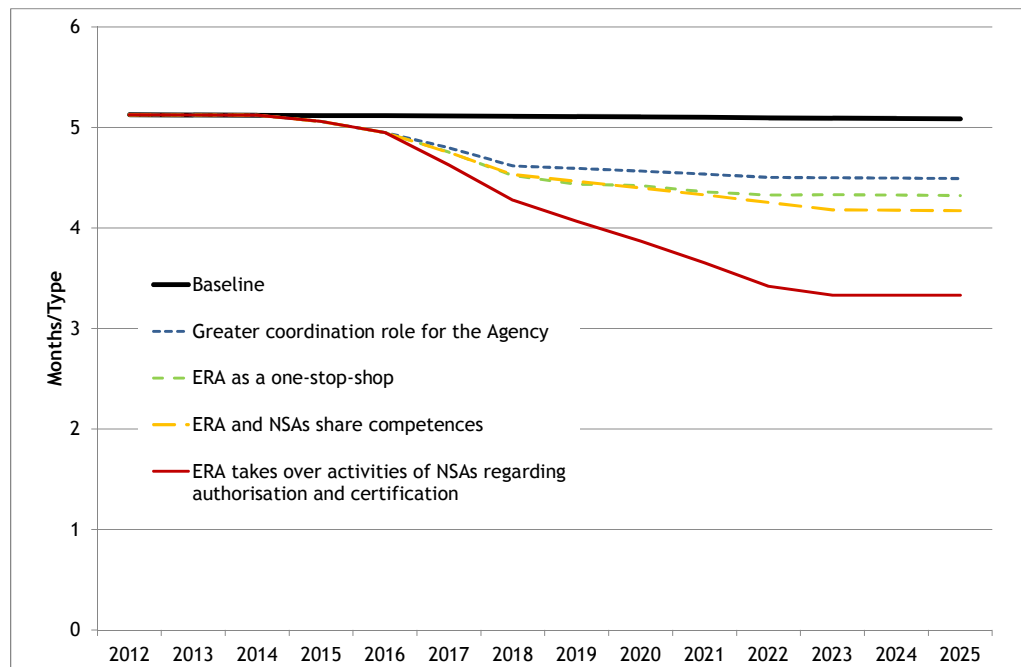
Breakdown of results: 1st country certification timescales

Forecast certification timescale trends by option for 1st certification are shown in Appendix Figure D.23 (passenger RUs) and Appendix Figure D.24 (freight RUs).

APPENDIX FIGURE D.23 AVERAGE 1ST COUNTRY CERTIFICATION TIMESCALES FOR PASSENGER RUS BY OPTION (2012-2025)



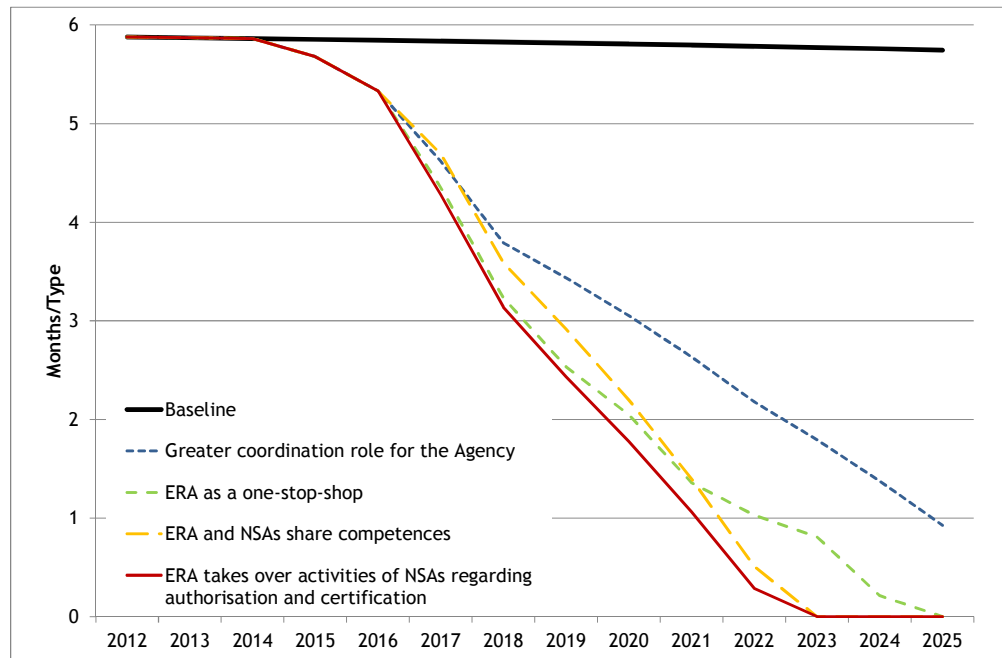
APPENDIX FIGURE D.24 AVERAGE 1ST COUNTRY CERTIFICATION TIMESCALES FOR FREIGHT RUS BY OPTION (2012-2025)



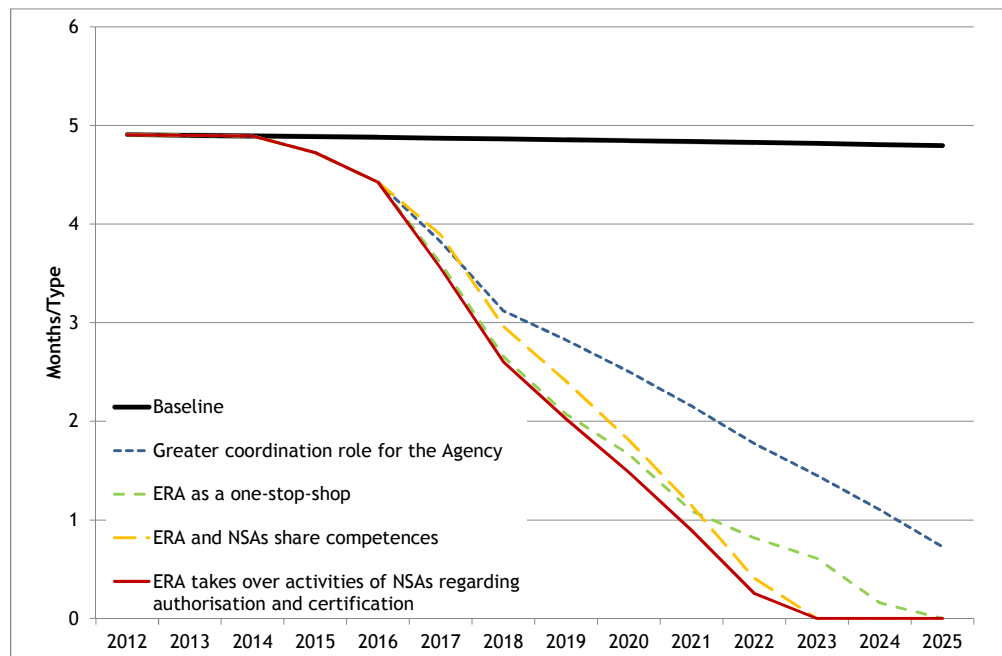
Breakdown of results: Additional country certification timescales

Forecast certification timescale trends by option for additional certification are shown in Appendix Figure D.25 (passenger RUs) and Appendix Figure D.26 (freight RUs). The large reductions reflect the substantial benefits of introducing a single safety certificate.

APPENDIX FIGURE D.25 AVERAGE ADDITIONAL COUNTRY CERTIFICATION TIMESCALES FOR PASSENGER RUS BY OPTION (2012-2025)



APPENDIX FIGURE D.26 AVERAGE ADDITIONAL COUNTRY CERTIFICATION TIMESCALES FOR FREIGHT RUS BY OPTION (2012-2025)



3 Qualitative assessment of indirect impacts, SME effects and sectoral competitiveness implications

Quantification of the indirect impacts set has not been carried out for a number of reasons:

- Considerable time and effort has been expended quantifying the direct impacts on costs and timescales of vehicle authorisation and railway undertaking safety certification. However, the complexity and multi-faceted nature of authorisation, in particular, means that precise estimation is not possible. Estimation of indirect impacts would therefore have been built off a base already containing a significant degree of uncertainty.
- One of the key links in the chain of causality between direct and indirect impacts is the impact of changes in vehicle authorisation costs and timescales on new entrant levels. Whilst there clearly is an impact, authorisation costs are only one component of a large set of costs and barriers which will affect new entry into the rail market and any quantification of this link would necessarily have been tenuous at best.
- Relative to authorisation cost savings most of the indirect impacts are anticipated to be small

It was therefore agreed with the DG MOVE impact assessment team that quantification of impacts would be restricted to direct impacts only. In addition to avoiding the production of highly uncertain forecasts it has enabled an increased focus on the core direct impacts.

In this section we therefore present a qualitative assessment of the indirect impacts of the non-combined options. The key conclusions are summarised in Appendix Table D.27 with additional textual analysis where appropriate after the table. In this context it is very difficult to identify a range of impact with the low/medium/high categorisation due to the level of uncertainty. However, we have defined 'low' as likely to reflect an impact hardly noticeable even at a country/market sector level, whilst 'medium' might be noticed in some countries and market sectors. Only 'high' impacts would be detectable at the EU level. Finally, for some impacts we have assessed the impact as zero where the impact is deemed to be so small as to be negligible.

The summary line at the bottom of the table provides our view of the global qualitative impact of each option. It is clear, and is discussed further below, that the global impacts are low across all options due to the very technical and sector specific impacts of the provisions within this initiative.

APPENDIX TABLE D.27 QUALITATIVE ASSESSMENT SUMMARY

Impact	Key indicator(s)	Magnitude of impact (High/Medium/Low)				
		Option 2	Option 3	Option 4	Option 5	Option 6
Effect on freight transport demand	Total rail freight tonne km	Low	Low	Low	Low	Low
Effect on rail freight prices	Price per tonne km	Low	Low	Medium	Medium	Low
Modal shift (freight)	Rail freight mode share	Low	Low	Low	Low	Low
Effect on passenger transport demand	Rail passenger km	Low	Low	Low	Low	Low
Change in service levels	Train km	Low	Low	Medium	Medium	Low
Modal shift (passenger)	Rail passenger mode share	Low	Low	Low	Low	Low
Effect on operational costs (beyond direct effects)	Total industry operational costs	Low	Low	Medium	Medium	Medium
Effect on fares for passengers	Average fares for passengers	Low	Low	Low	Low	Low
Effect on rail investment	Total capital expenditure on rolling stock	Low	Low	Medium	Medium	Low
Effect on industry revenue (beyond direct effects)	Total rail industry revenue	Low	Low	Low	Low	Low
Effect on public funding	Total rail subsidy	Low	Low	Low	Low	Low
Effect on market structure	New entrant market share	Low	Low	Medium	Medium	Low
Effect on employment levels and working conditions	Total rail employment Average wage	Low	Low	Low	Low	Low
Effect on GHG emissions	Total CO ₂ emissions (tonnes)	Low	Low	Low	Low	Low
Noise emissions	Total noise emissions (in dB(A))	Low	Low	Low	Low	Low
Local air quality	Concentration of atmospheric pollutants	Low	Low	Low	Low	Low
Rail safety	Number of fatalities	Zero	Zero	Zero	Zero	Zero
Passenger security	Number of crimes on rail network	Zero	Zero	Zero	Zero	Zero
Maintenance costs	Total maintenance costs	Zero	Zero	Zero	Zero	Low
Global qualitative impact evaluation		Low	Low	Low/ Medium	Low/ Medium	Low

Additional explanation of qualitative assessment in Appendix Table D.27***Effect on operational costs***

The dominant impact on operational costs will be the fall in vehicle authorisation timescales reducing the need to cover services using alternative rolling stock (either via lease or sub-contract) whilst waiting for delayed authorisations. This has been measured separately as part of the 'opportunity cost' indicator. The other key impact of improved vehicle authorisation will be the removal of a significant barrier to entry for new entrants. It can be anticipated that an increase in new entrants will result in lower average costs in the industry.

Effect on rail freight prices

Rail freight prices will be impacted through two mechanisms:

- Reduction in prices through incumbent freight operators passing through a proportion of cost savings from cheaper authorisation to customers
- New entrants entering the market due to lower authorisation and certification costs reducing the barriers to entry

It is likely that the overall impact on prices will be low or medium at best in all options for three reasons:

- Authorisation changes, though, substantial in absolute terms are only one component of railway undertaking costs
- Since in many cases a large proportion of cost savings accrue to manufacturers and lessors of rolling stock as well as railway undertakings i.e. another step removed from customers some of the savings are likely to be taken in increased margin further up the supply chain
- The majority of cost savings will still be for incumbent freight operators often operating in markets with little competition with low incentives to reduce prices

Effect on fares for passengers

As for freight prices it is likely that the impact on passenger fares will be low for all options. Given that the key impacts are for locomotives which overwhelmingly affect the freight sector, the impact on passenger fares is likely to be very small.

Change in service levels

Reduced authorisation costs could result in additional new entry into the market, stimulating increased service levels and also stimulate an improved service offer from incumbent operators. Impacts, however, are likely to be isolated to a limited number of specific cases, even in the highest impact options.

Effect on freight transport demand

Reduced authorisation costs could result in additional freight demand through lower prices and improved service offer. However, impact will be very small.

Effect on passenger transport demand

Reduced authorisation costs could result in additional passenger demand through lower prices and improved service offer. However, impact will be very small.

Modal shift (freight)

A proportion of the additional rail freight demand will be abstracted from competing modes of freight transport. The key competitor mode for rail freight is road and therefore the majority of abstracted demand will be drawn from road haulage. However, with only a very small anticipated increase in rail demand, mode shift will be correspondingly very small.

Modal shift (passenger)

A proportion of the additional rail passenger demand will be abstracted from competing modes of passenger transport. However, with only a very small anticipated increase in rail demand, mode shift will be correspondingly very small.

Effect on rail investment

Most railway investment, particularly at an infrastructure level is funded by public investment and as such is politically driven and likely to be independent of vehicle authorisation. There will be some impact on investment through faster authorisation enabling new investments to be brought forward in some instances although this is hard to quantify. Also, both authorisation and opportunity cost savings could be used to finance additional investment but again this is difficult to quantify since these savings could also simply be used to reduce public subsidy requirements. Finally, increased new entry could generate additional investment. However, given the relatively small size of the combined opportunity cost and authorisation cost savings compared to total rolling stock investment (<3% in central case) and an uncertain link between cost savings and additional investment, effects on investment are not likely to be large.

Effect on industry revenue

Impact on industry revenue beyond any direct effects captured in the opportunity cost indicator will be low, reflecting the small changes in demand.

Effect on non-operational costs

The key cost change other than reductions in operational cost changes induced by new entrants will be a reduction in authorisation costs. Whilst the changes are substantial, as a proportion of non-operational costs they will be relatively low.

Effect on public funding

The impact on public funding will be composed of two key components:

- Change in costs and revenues of publicly funded RUs due to new entrants
- Reduction in authorisation costs borne by publicly funded RUs

Compared to the total level of public funding the effects will be low in all options.

Effect on market structure

The key impact of improved vehicle authorisation will be the removal of a significant barrier to entry for new entrants which will encourage more new entrants to the market. This will be most significant in countries where discrimination against new entrants is currently an issue. For options 4 and 5 this could have a noticeable impact in some countries.

Effect on employment levels and working conditions

There will be some impact on employment levels where additional staff are required to run additional services that become viable. However, in some instances it is likely that a portion of authorisation cost savings could be reflected in job reductions. Total impacts are hard to quantify but overall impacts are likely to be small.

The implementation of different policy measures would also have effects on the employees of NSAs and NoBos. The numeric terms, however, the effect would be rather limited, with staffing variations in the NSAs likely to change between 2 and 10 staff members on average, depending on the policy option implemented. The effects on NoBos would be assumingly negligible, as they would be marginally affected by the policy measure in terms of staff requirements.

Effect on GHG emissions, Noise emissions and Local air quality

Impact on these three indicators will be driven by three effects:

- i) Increased train service levels
- ii) Faster introduction of more efficient, quieter locomotives
- iii) Reduced travel on other modes (primarily road haulage and car use)

However, these effects will all be small with the most significant impact being from the introduction of more efficient locomotives.

Rail safety

Impact on safety standards will be very limited especially since safety standards are regulated by external authorities and therefore the key driver of safety standards is the effectiveness of those external bodies rather than the operators themselves. However, it could be suggested that passengers might have different perceptions on the safety of new entrants compared to incumbents although there wasn't any evidence on this from the survey.

Passenger security

Very limited effect with none of the main drivers directly impacting rail safety.

Maintenance Costs

Measure 4.7 (Enhanced role of ERA in identifying potential spare parts to be standardised and coordination of industry activities in this area) has a potential impact on maintenance costs by substantially reducing the cost of and number of spare parts required to be maintained.

Evidence presented by Deutsche Bahn AG and SNCF to a European Parliamentary Lunch on the 8th February 2012 highlighted the substantial cost savings that could be generated by reducing the huge variety of non-standardised spare parts currently in existence.

Spare parts represent a large cost to the rail industry with Deutsche Bahn AG and SNCF alone spending up to €500m a year on spare parts, representing up to 30% of their entire rolling stock purchase budget.

Deutsche Bahn AG estimate that standardisation of the rail wheels they use could reduce the number of wheel types they currently stock from 190 to just 15 with an associated cost saving of 60% on their circa €50m annual wheel budget.

Wheels represent only one area of potential savings with other items for potential standardisation identified by Deutsche Bahn AG and SNCF including:

- Brake discs
- Wheel set bearings
- Axles
- Wheel-set
- Pantograph contact strips
- Odometry (train speed measurement)
- Display's in drivers cabs
- Brake blocks/brake parts

In total there is the potential to save hundreds of millions of euros annually with the widespread standardisation of spare parts.

Whilst the potential savings from standardisation are large it is not clear whether measure 4.7 is likely to realise a significant portion of these savings. Interested parties (i.e. manufacturers) have a strong interest in maintaining the status quo where they retain a position as monopoly supplier for many products. Therefore some form of legal requirement (e.g. inclusion of standardised parts in TSIs) would be required to achieve significant changes beyond the current voluntary arrangements. However, the Agency carried out a study into the interchangeability of spare parts in 2011 which suggested that TSIs were not the appropriate mechanism with questions as to the feasibility of defining interchangeability in a TSI in a manner that was 'transparent and non-discriminatory'.

Assessment of impacts on micro, small and medium sized enterprises

The Commission Recommendation 2003/361/EC of 6 May 2003 defined micro, small and medium-sized enterprises as follows:

- i) Medium-sized enterprise - employs fewer than 250 persons and whose annual turnover does not exceed EUR 50 million or whose annual balance-sheet total does not exceed EUR 43 million.
- ii) Small enterprise - employs fewer than 50 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 10 million.
- iii) Microenterprise - employs fewer than 10 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 2 million

The key company groups impacted by the proposed options are:

- Passenger Railway Undertakings
- Freight Railway Undertakings
- NoBos
- ROSCOs
- Rolling stock suppliers

For these groups the effects of the proposed options will be primarily positive with reductions in authorisation costs and timescales benefiting both passenger and freight railway undertakings, ROSCOs and Rolling stock suppliers. In addition benefits are likely to be larger proportionately for smaller type sizes which it would be anticipated would disproportionately benefit SMEs. Finally, benefits are likely to be most significant for new entrants currently facing discriminatory authorisation processes, a higher proportion of which will be SMEs than for current incumbents.

The one company group where the options will result in additional costs is for NoBos. This will result from measure 2.1.B proposing coordination and supervision of NoBos in options 2 to 5. However, apart from complying with guidance the main cost for NoBos will be facilitating audits by the Agency which should represent a small cost.

Investigation of a sample of NoBos indicates that a range of companies operate in this area. whilst this is an area of specialism, NoBo company units are often part of a bigger company group, often a large multi-disciplinary group (e.g. Interfleet, Altran Praxis). Medium/small size companies do exist (e.g. Sconrail which is a joint venture between three parent companies).

Given the relatively small impact of the options (and the existence of a similar cost to SME NoBos in all the non-baseline options) we have not undertaken further detailed analysis of the proportion of NoBos which fall into the SME category. However, we also recognise that new entrants to the NoBo market, in particular, could fall in the SME category as the market for NoBos develops.

Therefore, we would recommend that:

- Levels of NoBo audit are proportional to the volume of work carried about by each NoBo
- Guidance to NoBos from ERA should avoid the creation of administrative costs not directly related to the frontline services of NoBos

Assessment of impacts on sectoral competitiveness

In total the options, as assessed, have a positive economic and social benefit. However, an additional dimension is the impact of the options on different sectors of the economy. Sectors impacted directly by the policy options are:

- Passenger Railway Undertakings
- Freight Railway Undertakings
- NoBos
- ROSCOs
- Rolling stock suppliers

Suppliers further up the rolling stock chain could also potentially be impacted by the policy options but these will be mainly component part manufacturers whose overall share of the value of the output rolling stock is likely to be small and hence scope for policy options to have large effects further up the supply chain will be limited.

Key questions to be answered with respect to sectoral competitiveness are:

- i) Will the options impact the cost and price competitiveness of the affected sectors?
- ii) Will the options impact the capacity to innovate of the affected sectors?
- iii) Will the options impact the international competitiveness of the affected sectors?

Cost and price competitiveness

All the options should improve the rail sector's cost and price competitiveness as a whole with effects in proportion to the reduction in authorisation and certification costs which have already been quantified. Analysis has been presented to the vehicle authorisation task force¹³ which indicated that in extreme cases ERTMS homologation costs could add 14-38% to the lease costs of locomotives.

However, if we assess the forecast savings from improved authorisation against total investment in rolling stock, the savings are significantly less. For example, UIC data from 2009 shows a total investment in rolling stock of €3.4bn across the EU. Compared with this total forecast authorisation cost savings of just over €40m p.a. in option 5 represent less than 2% of total investment costs. This suggests potential price competitiveness changes on average are small.

The key benefits of any increased price and cost competitiveness will manifest themselves in the ability of the passenger and freight RU market sectors to attract increased mode share via lower prices. Given significant scope for a significant portion of any cost savings to be accrued directly by the rolling stock supply sector, competitiveness advantages to RUs (for which rolling stock costs are only one component of overall costs) are likely, on average, to be very small.

Capacity to innovate and international competitiveness

There is some scope for the options under consideration to increase the capacity to innovate of the rolling stock supply sector by removing unduly restrictive approaches to authorisation of new rolling stock types. The precise magnitude, however, of this effect is very difficult to ascertain with other highly significant factors also relevant such as the prescriptive (or otherwise) nature of TSIs.

None of the options will significantly affect the rail sector's ability to compete internationally (no impact on authorisations in other countries). It is possible, however, that non-European RUs could find it easier to enter the European market as a result of the options.

Summary

Based on the qualitative analysis outlined in the preceding paragraphs we believe that impacts on sectoral competitiveness will be primarily positive and small and not likely to change the relative merits of the different options.

¹³ Presentation entitled 'The Cost of Ownership of ETCS' presented by MRCE

4 The Impact Assessment Calculator

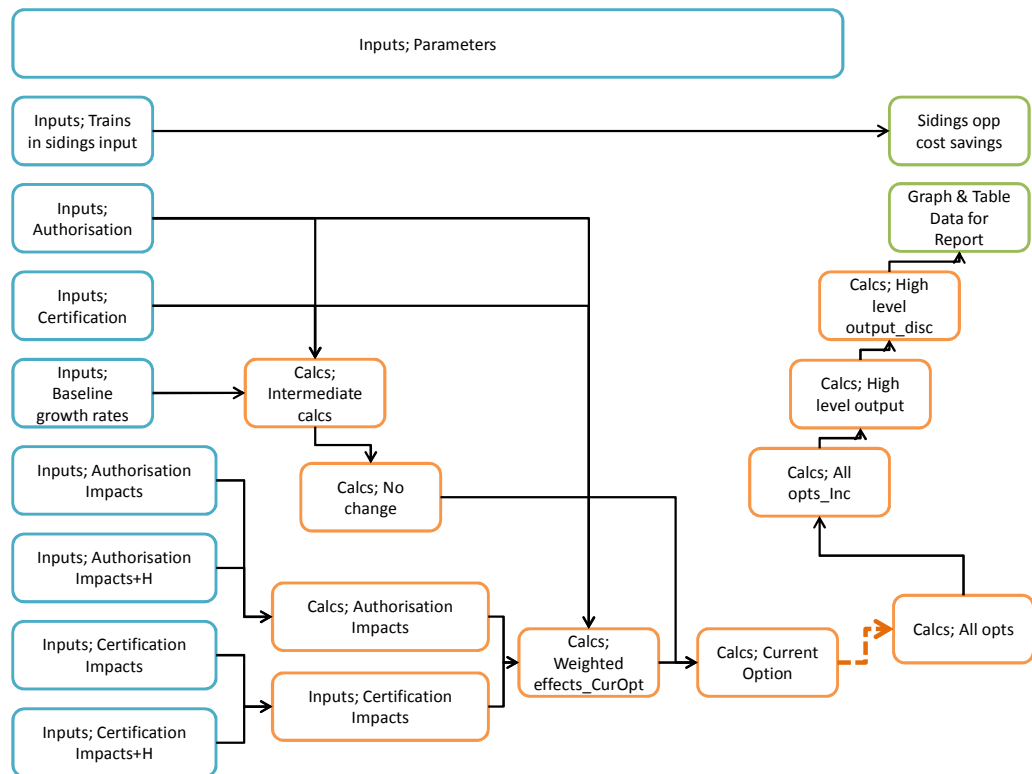
Introduction

Key inputs to the impact assessment calculator are summarised in section 1 of this appendix. This section of the appendix sets out the structure of the impact assessment calculator sheet by sheet, detailing inputs and elaborating intermediate calculations. A substantial number of screenshots have been included for illustrative purposes.

Impact assessment calculator structure

The structure of the impact assessment calculator with information flows between key worksheets is set out in the figure below:

APPENDIX FIGURE D.27 IMPACT ASSESSMENT CALCULATOR STRUCTURE



Impact assessment calculator - step by step through input and calculation worksheets

In this section we step through the input and calculation worksheets of the impact assessment calculator, highlighting key assumptions and calculations.

Inputs; Parameters

The parameters worksheet contains a number of key parameters and variable lists used throughout the calculator. These include:

- Option List
- Country types

- Country list
- Authorisation categories
- Certification categories
- ‘Perfect’ authorisation and certification costs and timescales
- Discount factor

In addition, there is a macro in this worksheet which enables the production of output for each option without needing to replicate core calculations in parallel for each option separately. A screenshot of part of this worksheet is included as Appendix Figure D.28:

APPENDIX FIGURE D.28 INPUTS; PARAMETERS WORKSHEET SCREENSHOT

The screenshot displays the 'Inputs; Parameters' worksheet with the following elements:

- Version Information:**
 - Version: 0.7
 - Contact Owner: Kevin Daswell
 - File: G:\Users\KDaswell\Documents\work in progress\ERA2\Post-UK-1- final meeting update\ERA_In_model_v1.7_inspections.xlsx | Parameters
- Options Section:**
 - A button labeled "Run Options".
 - A dropdown menu for "Current Option" set to "Option 6".
 - A dropdown menu for "With Horizontal measures?" set to "Yes".
 - A table listing options:

Option	Description
Option 1	Baseline scenario (Do nothing)
Option 2	Greater coordination role for the Agency
Option 3	ERA as a one-stop-shop
Option 4	ERA with national subsidiaries/regional offices
Option 5	The Agency does the majority of tasks in house
Option 6	Horizontal measures
- Country Type Section:**
 - A dropdown menu for "Country Type" with options: Average, Low resource, Challenging.
- Country List Section:**
 - A header for the "Country List" section.

The majority of inputs in this worksheet have been detailed in the main report together with a description of their derivation and no further detail is therefore included here.

Inputs; Trains in sidings input

This worksheet contains data on the number and value of new vehicles in sidings based on data collated by the Agency. Also included are estimates of the monthly opportunity cost of the rolling stock in sidings as a percentage of total value. See section 1 for more detail on the derivation of these numbers.

Derivation of numbers and value of vehicles in sidings

The Agency has supplied data on publically recorded occurrences of vehicles with a delayed introduction, sitting in sidings in 2011, for multiple units and locomotives¹⁴. We have apportioned these between 1st country and additional

¹⁴ Note that this does not include the delayed production of vehicles in response to slow initial authorisation which is an additional source of cost and lost revenue.

country authorisations based on the split assumed in the base data for authorisations for new rolling stock.

The Agency's latest estimate of the average value of new rolling stock is €3.12m¹⁵. In addition we have estimated, based on publically available data, that the average value of a new multiple unit vehicle is €1.5m. This coincides with an estimate provided by the Agency of €1.55m. As stated in the main report locomotives and multiple units form the bulk of vehicles with delayed introduction to service. Combining the numbers and average values creates the following inputs into the model:

APPENDIX TABLE D.28 VALUE OF ROLLING STOCK DELAYED IN SIDINGS

Authorisation category	Value of rolling stock in sidings (€m)	Number of vehicles (average point number)
New locomotive type authorisation (1st country)	29	9
New Multiple Unit type authorisation (1st country)	108	72
New locomotive type authorisation (additional country)	292	94
New Multiple Unit type authorisation (additional country)	1083	722

Estimating opportunity cost of rolling stock in sidings

The opportunity cost of rolling stock in sidings is an area of considerable uncertainty and we have therefore constructed three alternative scenarios. Input values for opportunity costs for the three scenarios are presented in the table below:

APPENDIX TABLE D.29 OPPORTUNITY COST OF VEHICLES IN SIDINGS

Scenario	Locomotives	Multiple Units
Central Case	1.0%	1.0%
Lower Bound	3.8%	1.9%
Upper Bound	6.7%	2.8%

¹⁵ Quoted at meeting on 2nd December 2011

Inputs; Authorisation

This worksheet contains base year authorisation numbers by country and authorisation category. Key assumptions behind these numbers are detailed in the main report.

Inputs; Certification

This worksheet contains base year authorisation numbers by country and authorisation category. Key assumptions behind these numbers are detailed in the main report.

Inputs; Baseline growth rates

This worksheet contains baseline growth rates of authorisations and certifications. As stated in the main report total growth rates are assumed to be zero but in the case of authorisations, there is assumed to be a shift between authorisations excluding ERTMS and those including ERTMS over time as the proportion of the EU rail network covered by ERTMS increases. These calculations are underpinned by the assumption that 25% of the EU network is covered by ERTMS by 2025. The assumed growth rates are shown in Appendix Figure D.29.

APPENDIX FIGURE D.29 SCREENSHOT FROM THE INPUTS; BASELINE GROWTH RATES WORKSHEET

Version	0.2
Control Owner	Kevin Dadswell
File	C:\Users\KDadswell\Documents\work in progress\ERA2\post final report comments update\ERA_IA_model_v2.3.xlsm\Inputs; Baseline growth rates

Authorisation Growth rates (number of vehicles)

Authorisation Type	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
New locomotive type authorisation (1st country)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
New wagon type authorisation (1st country)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
New Multiple Unit type authorisation (1st country)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
New Coach type authorisation (1st country)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
New locomotive type authorisation (additional country)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
New wagon type authorisation (additional country)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
New Multiple Unit type authorisation (additional country)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
New Coach type authorisation (additional country)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Locomotive type re-authorisation without ERTMS (1st country)	0%	0%	0%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%
Locomotive type re-authorisation with ERTMS (1st country)	0%	0%	0%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%
Number of wagon type re-authorisations (1st country)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Multiple Unit type re-authorisation without ERTMS (1st country)	0%	0%	0%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%
Multiple Unit type re-authorisation with ERTMS (1st country)	0%	0%	0%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%
Coach type re-authorisation (1st country)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Locomotive type re-authorisation without ERTMS (additional country)	0%	0%	0%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%
Locomotive type re-authorisation with ERTMS (additional country)	0%	0%	0%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%
Wagon type re-authorisation (additional country)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Multiple Unit type re-authorisation without ERTMS (additional country)	0%	0%	0%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%
Multiple Unit type re-authorisation with ERTMS (additional country)	0%	0%	0%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%
Coach type re-authorisation (additional country)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Certification Growth rates (number of railway undertakings)

Certification Type	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Safety Certification (1st Country) - Freight	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Safety Certification (additional Country) - Freight	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Safety Certification (1st Country) - Passenger	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Safety Certification (additional Country) - Passenger	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Inputs; Authorisation Impacts, Inputs; Authorisation Impacts+H, Inputs; Certification Impacts & Inputs; Certification Impacts+H

These worksheets contain the impacts of the different policy options on authorisation and certification costs and timescales by country type (average, low-resource, challenging) for the non-combined and combined options. They include a total impact by authorisation and certification category and then a phasing of the impact. Note that the absolute impact used in the calculator represents the reduction in the *gap* between current costs and timescales and 'perfect' costs and timescales, not a reduction in the *total* costs/timescales.

Given the number of measures of which the policy options are composed and the overlapping effects of different measures a systematic approach was required to produce the inputs in this sheet in a form which could then be readily updated. We have therefore constructed a separate spreadsheet to compile these inputs and this is described in more detail later in the appendix.

On the following pages we have included a sequence of screenshots from these worksheets for the baseline option with impacts on all country types and both costs and timescales. (Appendix Figure D.30 to Appendix Figure D.41).

APPENDIX FIGURE D.30 SCREENSHOT FROM THE INPUTS; AUTHORISATION IMPACTS WORKSHEET - BASELINE OPTION COST IMPACTS, AVERAGE COUNTRY

Version	1.0
Control Owner	Kevin Dadswell
File	C:\Users\KDadswell\Documents\work in progress\ERA2\Post draft final meeting update\ERA_IA_modeL_v1.8.xlsm\Inputs; Authorisation Impacts

Total effects are expressed as reduction of gap between current costs/timescales and 'perfect' authorisation

Option 1: Baseline scenario (Do nothing)

Impact on Authorisation Costs: Average

Authorisation Type	Total effect	Phasing>>																	
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
New locomotive type authorisation (1st country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
New wagon type authorisation (1st country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
New Multiple Unit type authorisation (1st country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
New Coach type authorisation (1st country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
New locomotive type authorisation (additional country)	45%	0%	0%	0%	6%	13%	20%	33%	45%	59%	76%	87%	91%	95%	95%	97%	98%	99%	100%
New wagon type authorisation (additional country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
New Multiple Unit type authorisation (additional country)	45%	0%	0%	0%	6%	13%	20%	33%	45%	59%	76%	87%	91%	95%	95%	97%	98%	99%	100%
New Coach type authorisation (additional country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
Locomotive type re-authorisation without ERTMS (1st country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
Locomotive type re-authorisation with ERTMS (1st country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
Number of wagon type re-authorisations (1st country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
Multiple Unit type re-authorisation without ERTMS (1st country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
Multiple Unit type re-authorisation with ERTMS (1st country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
Coach type re-authorisation (1st country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
Locomotive type re-authorisation without ERTMS (additional country)	45%	0%	0%	0%	6%	13%	20%	33%	45%	59%	76%	87%	91%	95%	95%	97%	98%	99%	100%
Locomotive type re-authorisation with ERTMS (additional country)	45%	0%	0%	0%	6%	13%	20%	33%	45%	59%	76%	87%	91%	95%	95%	97%	98%	99%	100%
Wagon type re-authorisation (additional country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
Multiple Unit type re-authorisation without ERTMS (additional country)	45%	0%	0%	0%	6%	13%	20%	33%	45%	59%	76%	87%	91%	95%	95%	97%	98%	99%	100%
Multiple Unit type re-authorisation with ERTMS (additional country)	45%	0%	0%	0%	6%	13%	20%	33%	45%	59%	76%	87%	91%	95%	95%	97%	98%	99%	100%
Coach type re-authorisation (additional country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%

APPENDIX FIGURE D.31 SCREENSHOT FROM THE INPUTS; CERTIFICATION IMPACTS WORKSHEET - BASELINE OPTION COST IMPACTS, AVERAGE COUNTRY

Impact on Certification Costs: Average

Vehicle Category	Total effect	Phasing>>																	
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Safety Certification (1st Country) - Freight	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%
Safety Certification (additional Country) - Freight	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%
Safety Certification (1st Country) - Passenger	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%
Safety Certification (additional Country) - Passenger	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%

APPENDIX FIGURE D.32 SCREENSHOT FROM THE INPUTS; AUTHORISATION IMPACTS WORKSHEET - BASELINE OPTION COST IMPACTS, LOW RESOURCE COUNTRY

Option 1: Baseline scenario (Do nothing)

Impact on Authorisation Costs: Low resource																			
Authorisation Type	Total effect	Phasing>>																	
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
New locomotive type authorisation (1st country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%
New wagon type authorisation (1st country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%
New Multiple Unit type authorisation (1st country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%
New Coach type authorisation (1st country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%
New locomotive type authorisation (additional country)	50%	0%	0%	0%	5%	11%	22%	39%	51%	63%	79%	88%	92%	95%	96%	97%	98%	99%	100%
New wagon type authorisation (additional country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%
New Multiple Unit type authorisation (additional country)	50%	0%	0%	0%	5%	11%	22%	39%	51%	63%	79%	88%	92%	95%	96%	97%	98%	99%	100%
New Coach type authorisation (additional country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%
Locomotive type re-authorisation without ERTMS (1st country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%
Locomotive type re-authorisation with ERTMS (1st country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%
Number of wagon type re-authorisations (1st country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%
Multiple Unit type re-authorisation without ERTMS (1st country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%
Multiple Unit type re-authorisation with ERTMS (1st country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%
Coach type re-authorisation (1st country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%
Locomotive type re-authorisation without ERTMS (additional country)	50%	0%	0%	0%	5%	11%	22%	39%	51%	63%	79%	88%	92%	95%	96%	97%	98%	99%	100%
Locomotive type re-authorisation with ERTMS (additional country)	50%	0%	0%	0%	5%	11%	22%	39%	51%	63%	79%	88%	92%	95%	96%	97%	98%	99%	100%
Wagon type re-authorisation (additional country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%
Multiple Unit type re-authorisation without ERTMS (additional country)	50%	0%	0%	0%	5%	11%	22%	39%	51%	63%	79%	88%	92%	95%	96%	97%	98%	99%	100%
Multiple Unit type re-authorisation with ERTMS (additional country)	50%	0%	0%	0%	5%	11%	22%	39%	51%	63%	79%	88%	92%	95%	96%	97%	98%	99%	100%
Coach type re-authorisation (additional country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%

APPENDIX FIGURE D.33 SCREENSHOT FROM THE INPUTS; CERTIFICATION IMPACTS WORKSHEET - BASELINE OPTION COST IMPACTS, LOW RESOURCE COUNTRY

Impact on Certification Costs: Low resource

Vehicle Category	Total effect	Phasing>>																	
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Safety Certification (1st Country) - Freight	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%
Safety Certification (additional Country) - Freight	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%
Safety Certification (1st Country) - Passenger	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%
Safety Certification (additional Country) - Passenger	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%

APPENDIX FIGURE D.34 SCREENSHOT FROM THE INPUTS; AUTHORISATION IMPACTS WORKSHEET - BASELINE OPTION COST IMPACTS, CHALLENGING COUNTRY

Option 1: Baseline scenario (Do nothing)																			
Impact on Authorisation Costs: Challenging																			
Authorisation Type	Total effect	Phasing>>																	
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
New locomotive type authorisation (1st country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
New wagon type authorisation (1st country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
New Multiple Unit type authorisation (1st country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
New Coach type authorisation (1st country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
New locomotive type authorisation (additional country)	33%	0%	0%	0%	3%	5%	8%	16%	31%	48%	70%	82%	87%	92%	94%	95%	97%	98%	100%
New wagon type authorisation (additional country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
New Multiple Unit type authorisation (additional country)	33%	0%	0%	0%	3%	5%	8%	16%	31%	48%	70%	82%	87%	92%	94%	95%	97%	98%	100%
New Coach type authorisation (additional country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
Locomotive type re-authorisation without ERTMS (1st country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
Locomotive type re-authorisation with ERTMS (1st country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
Number of wagon type re-authorisations (1st country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
Multiple Unit type re-authorisation without ERTMS (1st country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
Multiple Unit type re-authorisation with ERTMS (1st country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
Coach type re-authorisation (1st country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
Locomotive type re-authorisation without ERTMS (additional country)	33%	0%	0%	0%	3%	5%	8%	16%	31%	48%	70%	82%	87%	92%	94%	95%	97%	98%	100%
Locomotive type re-authorisation with ERTMS (additional country)	33%	0%	0%	0%	3%	5%	8%	16%	31%	48%	70%	82%	87%	92%	94%	95%	97%	98%	100%
Wagon type re-authorisation (additional country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
Multiple Unit type re-authorisation without ERTMS (additional country)	33%	0%	0%	0%	3%	5%	8%	16%	31%	48%	70%	82%	87%	92%	94%	95%	97%	98%	100%
Multiple Unit type re-authorisation with ERTMS (additional country)	33%	0%	0%	0%	3%	5%	8%	16%	31%	48%	70%	82%	87%	92%	94%	95%	97%	98%	100%
Coach type re-authorisation (additional country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%

APPENDIX FIGURE D.35 SCREENSHOT FROM THE INPUTS; CERTIFICATION IMPACTS WORKSHEET - BASELINE OPTION COST IMPACTS, CHALLENGING COUNTRY

Impact on Certification Costs: Challenging																			
Vehicle Category	Total effect	Phasing>>																	
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Safety Certification (1st Country) - Freight	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%
Safety Certification (additional Country) - Freight	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%
Safety Certification (1st Country) - Passenger	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%
Safety Certification (additional Country) - Passenger	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%

APPENDIX FIGURE D.36 SCREENSHOT FROM THE INPUTS; AUTHORISATION IMPACTS WORKSHEET - BASELINE OPTION TIMESCALE IMPACTS, AVERAGE COUNTRY

Option 1: Baseline scenario (Do nothing)

Impact on Authorisation Timescales: Average																			
Authorisation Type	Total effect	Phasing>>																	
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
New locomotive type authorisation (1st country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
New wagon type authorisation (1st country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
New Multiple Unit type authorisation (1st country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
New Coach type authorisation (1st country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
New locomotive type authorisation (additional country)	45%	0%	0%	0%	6%	13%	20%	33%	45%	59%	76%	87%	91%	95%	95%	97%	98%	99%	100%
New wagon type authorisation (additional country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
New Multiple Unit type authorisation (additional country)	45%	0%	0%	0%	6%	13%	20%	33%	45%	59%	76%	87%	91%	95%	95%	97%	98%	99%	100%
New Coach type authorisation (additional country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
Locomotive type re-authorisation without ERTMS (1st country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
Locomotive type re-authorisation with ERTMS (1st country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
Number of wagon type re-authorisations (1st country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
Multiple Unit type re-authorisation without ERTMS (1st country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
Multiple Unit type re-authorisation with ERTMS (1st country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
Coach type re-authorisation (1st country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
Locomotive type re-authorisation without ERTMS (additional country)	45%	0%	0%	0%	6%	13%	20%	33%	45%	59%	76%	87%	91%	95%	95%	97%	98%	99%	100%
Locomotive type re-authorisation with ERTMS (additional country)	45%	0%	0%	0%	6%	13%	20%	33%	45%	59%	76%	87%	91%	95%	95%	97%	98%	99%	100%
Wagon type re-authorisation (additional country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%
Multiple Unit type re-authorisation without ERTMS (additional country)	45%	0%	0%	0%	6%	13%	20%	33%	45%	59%	76%	87%	91%	95%	95%	97%	98%	99%	100%
Multiple Unit type re-authorisation with ERTMS (additional country)	45%	0%	0%	0%	6%	13%	20%	33%	45%	59%	76%	87%	91%	95%	95%	97%	98%	99%	100%
Coach type re-authorisation (additional country)	35%	0%	0%	0%	5%	11%	17%	30%	43%	57%	74%	83%	88%	93%	94%	96%	97%	98%	100%

APPENDIX FIGURE D.37 SCREENSHOT FROM THE INPUTS; CERTIFICATION IMPACTS WORKSHEET - BASELINE OPTION TIMESCALE IMPACTS, AVERAGE COUNTRY

Impact on Certification Timescales: Average

Vehicle Category	Total effect	Phasing>>																		
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Safety Certification (1st Country) - Freight	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%	
Safety Certification (additional Country) - Freight	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%	
Safety Certification (1st Country) - Passenger	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%	
Safety Certification (additional Country) - Passenger	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%	

APPENDIX FIGURE D.38 SCREENSHOT FROM THE INPUTS; AUTHORISATION IMPACTS WORKSHEET - BASELINE OPTION TIMESCALE IMPACTS, LOW RESOURCE COUNTRY

Option 1: Baseline scenario (Do nothing)

Impact on Authorisation Timescales: Low resource

Authorisation Type	Total effect	Phasing>>																		
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
New locomotive type authorisation (1st country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%	
New wagon type authorisation (1st country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%	
New Multiple Unit type authorisation (1st country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%	
New Coach type authorisation (1st country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%	
New locomotive type authorisation (additional country)	50%	0%	0%	0%	5%	11%	22%	39%	51%	63%	79%	88%	92%	95%	96%	97%	98%	99%	100%	
New wagon type authorisation (additional country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%	
New Multiple Unit type authorisation (additional country)	50%	0%	0%	0%	5%	11%	22%	39%	51%	63%	79%	88%	92%	95%	96%	97%	98%	99%	100%	
New Coach type authorisation (additional country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%	
Locomotive type re-authorisation without ERTMS (1st country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%	
Locomotive type re-authorisation with ERTMS (1st country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%	
Number of wagon type re-authorisations (1st country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%	
Multiple Unit type re-authorisation without ERTMS (1st country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%	
Multiple Unit type re-authorisation with ERTMS (1st country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%	
Coach type re-authorisation (1st country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%	
Locomotive type re-authorisation without ERTMS (additional country)	50%	0%	0%	0%	5%	11%	22%	39%	51%	63%	79%	88%	92%	95%	96%	97%	98%	99%	100%	
Locomotive type re-authorisation with ERTMS (additional country)	50%	0%	0%	0%	5%	11%	22%	39%	51%	63%	79%	88%	92%	95%	96%	97%	98%	99%	100%	
Wagon type re-authorisation (additional country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%	
Multiple Unit type re-authorisation without ERTMS (additional country)	50%	0%	0%	0%	5%	11%	22%	39%	51%	63%	79%	88%	92%	95%	96%	97%	98%	99%	100%	
Multiple Unit type re-authorisation with ERTMS (additional country)	50%	0%	0%	0%	5%	11%	22%	39%	51%	63%	79%	88%	92%	95%	96%	97%	98%	99%	100%	
Coach type re-authorisation (additional country)	40%	0%	0%	0%	4%	10%	20%	39%	50%	62%	78%	85%	89%	94%	95%	96%	97%	99%	100%	

APPENDIX FIGURE D.39 SCREENSHOT FROM THE INPUTS; CERTIFICATION IMPACTS WORKSHEET - BASELINE OPTION TIMESCALE IMPACTS, LOW RESOURCE COUNTRY

Impact on Certification Timescales: Low resource

Vehicle Category	Total effect	Phasing>>																	
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Safety Certification (1st Country) - Freight	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%
Safety Certification (additional Country) - Freight	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%
Safety Certification (1st Country) - Passenger	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%
Safety Certification (additional Country) - Passenger	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%

APPENDIX FIGURE D.40 SCREENSHOT FROM THE INPUTS; AUTHORISATION IMPACTS WORKSHEET - BASELINE OPTION TIMESCALE IMPACTS, CHALLENGING COUNTRY

Option 1: Baseline scenario (Do nothing)

Impact on Authorisation Timescales: Challenging																			
Authorisation Type	Total effect	Phasing>>																	
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
New locomotive type authorisation (1st country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
New wagon type authorisation (1st country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
New Multiple Unit type authorisation (1st country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
New Coach type authorisation (1st country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
New locomotive type authorisation (additional country)	33%	0%	0%	0%	3%	5%	8%	16%	31%	48%	70%	82%	87%	92%	94%	95%	97%	98%	100%
New wagon type authorisation (additional country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
New Multiple Unit type authorisation (additional country)	33%	0%	0%	0%	3%	5%	8%	16%	31%	48%	70%	82%	87%	92%	94%	95%	97%	98%	100%
New Coach type authorisation (additional country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
Locomotive type re-authorisation without ERTMS (1st country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
Locomotive type re-authorisation with ERTMS (1st country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
Number of wagon type re-authorisations (1st country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
Multiple Unit type re-authorisation without ERTMS (1st country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
Multiple Unit type re-authorisation with ERTMS (1st country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
Coach type re-authorisation (1st country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
Locomotive type re-authorisation without ERTMS (additional country)	33%	0%	0%	0%	3%	5%	8%	16%	31%	48%	70%	82%	87%	92%	94%	95%	97%	98%	100%
Locomotive type re-authorisation with ERTMS (additional country)	33%	0%	0%	0%	3%	5%	8%	16%	31%	48%	70%	82%	87%	92%	94%	95%	97%	98%	100%
Wagon type re-authorisation (additional country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%
Multiple Unit type re-authorisation without ERTMS (additional country)	33%	0%	0%	0%	3%	5%	8%	16%	31%	48%	70%	82%	87%	92%	94%	95%	97%	98%	100%
Multiple Unit type re-authorisation with ERTMS (additional country)	33%	0%	0%	0%	3%	5%	8%	16%	31%	48%	70%	82%	87%	92%	94%	95%	97%	98%	100%
Coach type re-authorisation (additional country)	28%	0%	0%	0%	1%	3%	4%	11%	27%	45%	67%	79%	85%	91%	93%	94%	96%	98%	100%

APPENDIX FIGURE D.41 SCREENSHOT FROM THE INPUTS; CERTIFICATION IMPACTS WORKSHEET - BASELINE OPTION TIMESCALE IMPACTS, CHALLENGING COUNTRY

Impact on Certification Timescales: Challenging

Vehicle Category	Total effect	Phasing>>																	
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Safety Certification (1st Country) - Freight	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%
Safety Certification (additional Country) - Freight	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%
Safety Certification (1st Country) - Passenger	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%
Safety Certification (additional Country) - Passenger	3%	0%	0%	0%	5%	10%	15%	20%	26%	32%	38%	45%	52%	59%	66%	74%	82%	91%	100%

Calcs; Intermediate calcs

This worksheet applies baseline growth rates from the *Inputs; Baseline growth rates* worksheet to the base level of authorisations and certifications to derive the change in number of type authorisations and certifications up to 2025.

Also in this sheet discount factors are calculated based on the discount factor included in the *Inputs; Parameters* worksheet.

Following impact assessment guidelines (main document, page 39), a discount rate of 4% has been used. Using 2012 as a base year for discounting then gives the discount factors set out in the table below.

APPENDIX TABLE D.30 DISCOUNT FACTORS IN IMPACT ASSESSMENT CALCULATOR

Year	Discount Factor
2012	1.00
2013	0.96
2014	0.92
2015	0.89
2016	0.85
2017	0.82
2018	0.79
2019	0.76
2020	0.73
2021	0.70
2022	0.68
2023	0.65
2024	0.62
2025	0.60

Calcs; No change

This worksheet calculates total costs and average timescales for each authorisation and certification category up to 2025 based on the number of type authorisations and certifications calculated in the *Calcs; Intermediate calcs* worksheet.

Calcs; Authorisation Impacts & Inputs; Certification Impacts

These two worksheets select the impact inputs with or without inclusion of horizontal measures dependent on the which variation has been selected in the parameters worksheet.

Calcs; Weighted effects_CurOpt

In this worksheet the selected impacts in the *Calcs; Authorisation Impacts* and *Inputs; Certification Impacts* worksheets are combined with authorisation and certification numbers by country in the *Inputs; Authorisation* and *Inputs; Certification* worksheets to produce an average impact on costs and timescales for each authorisation and certification category. This includes accounting for the different impacts by average, low resource and challenging countries. Screenshots of the calculations in this sheet for the baseline option are included as Appendix Figure D.42 to Appendix Figure D.44. Note that these figures can be compared to Appendix Figure D.30 to Appendix Figure D.41 to see the effect of amalgamating the impacts by country type into a single effect and combining the total effect with the assumed phasing. In addition in this worksheet, the impacts are now expressed as a percentage of *total* costs rather than as a percentage of the gap between current and ‘perfect’ costs.

**APPENDIX FIGURE D.42 SCREENSHOT OF OUTPUT FROM THE CALCS; WEIGHTED EFFECTS_CUROPT WORKSHEET - BASELINE OPTION
AUTHORISATION COST IMPACT**

Average option impacts											
Impact on average Authorisation Costs											
Authorisation Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
New locomotive type authorisation (1st country)	2.0%	2.8%	3.8%	4.4%	4.6%	4.9%	5.0%	5.1%	5.2%	5.2%	5.3%
New wagon type authorisation (1st country)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
New Multiple Unit type authorisation (1st country)	2.7%	3.7%	5.0%	5.6%	5.9%	6.3%	6.4%	6.4%	6.5%	6.7%	6.8%
New Coach type authorisation (1st country)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
New locomotive type authorisation (additional country)	7.1%	9.9%	13.2%	15.3%	16.0%	16.8%	17.0%	17.2%	17.4%	17.7%	17.9%
New wagon type authorisation (additional country)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
New Multiple Unit type authorisation (additional country)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
New Coach type authorisation (additional country)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Locomotive type re-authorisation without ERTMS (1st country)	5.9%	8.4%	11.4%	13.0%	13.8%	14.7%	14.9%	15.1%	15.4%	15.7%	15.9%
Locomotive type re-authorisation with ERTMS (1st country)	5.9%	8.4%	11.4%	13.0%	13.8%	14.7%	14.9%	15.1%	15.4%	15.7%	15.9%
Number of wagon type re-authorisations (1st country)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Multiple Unit type re-authorisation without ERTMS (1st country)	2.2%	3.2%	4.4%	5.1%	5.4%	5.7%	5.8%	5.9%	6.0%	6.1%	6.2%
Multiple Unit type re-authorisation with ERTMS (1st country)	2.2%	3.2%	4.4%	5.1%	5.4%	5.7%	5.8%	5.9%	6.0%	6.1%	6.2%
Coach type re-authorisation (1st country)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Locomotive type re-authorisation without ERTMS (additional country)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Locomotive type re-authorisation with ERTMS (additional country)	5.3%	7.3%	9.8%	11.2%	11.8%	12.4%	12.5%	12.7%	12.8%	13.0%	13.2%
Wagon type re-authorisation (additional country)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Multiple Unit type re-authorisation without ERTMS (additional country)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Multiple Unit type re-authorisation with ERTMS (additional country)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Coach type re-authorisation (additional country)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

**APPENDIX FIGURE D.43 SCREENSHOT OF OUTPUT FROM THE CALCS; WEIGHTED EFFECTS_CUROPT WORKSHEET - BASELINE OPTION
AUTHORISATION TIMESCALES IMPACT**

Impact on average Authorisation Timescales											
Authorisation Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
New locomotive type authorisation (1st country)	3.0%	4.2%	5.8%	6.5%	6.9%	7.4%	7.5%	7.6%	7.7%	7.9%	8.0%
New wagon type authorisation (1st country)	2.6%	4.1%	6.0%	7.0%	7.5%	8.0%	8.1%	8.3%	8.4%	8.6%	8.8%
New Multiple Unit type authorisation (1st country)	3.4%	4.7%	6.2%	7.0%	7.4%	7.8%	7.9%	8.1%	8.2%	8.3%	8.5%
New Coach type authorisation (1st country)	2.5%	3.8%	5.3%	6.1%	6.5%	6.9%	7.1%	7.2%	7.3%	7.4%	7.6%
New locomotive type authorisation (additional country)	7.1%	9.9%	13.2%	15.3%	16.0%	16.8%	17.0%	17.2%	17.4%	17.7%	17.9%
New wagon type authorisation (additional country)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
New Multiple Unit type authorisation (additional country)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
New Coach type authorisation (additional country)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Locomotive type re-authorisation without ERTMS (1st country)	5.9%	8.4%	11.4%	13.0%	13.8%	14.7%	14.9%	15.1%	15.4%	15.7%	15.9%
Locomotive type re-authorisation with ERTMS (1st country)	3.9%	5.6%	7.6%	8.7%	9.2%	9.8%	9.9%	10.1%	10.3%	10.4%	10.6%
Number of wagon type re-authorisations (1st country)	2.8%	3.7%	4.8%	5.3%	5.6%	5.9%	6.0%	6.1%	6.2%	6.3%	6.4%
Multiple Unit type re-authorisation without ERTMS (1st country)	2.8%	4.0%	5.5%	6.3%	6.7%	7.2%	7.3%	7.4%	7.5%	7.6%	7.8%
Multiple Unit type re-authorisation with ERTMS (1st country)	2.9%	4.1%	5.7%	6.6%	7.0%	7.4%	7.5%	7.7%	7.8%	7.9%	8.1%
Coach type re-authorisation (1st country)	3.6%	4.8%	6.4%	7.2%	7.6%	8.0%	8.1%	8.2%	8.4%	8.5%	8.6%
Locomotive type re-authorisation without ERTMS (additional country)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Locomotive type re-authorisation with ERTMS (additional country)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Wagon type re-authorisation (additional country)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Multiple Unit type re-authorisation without ERTMS (additional country)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Multiple Unit type re-authorisation with ERTMS (additional country)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Coach type re-authorisation (additional country)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

**APPENDIX FIGURE D.44 SCREENSHOT OF OUTPUT FROM THE CALCS; WEIGHTED EFFECTS_CUROPT WORKSHEET - BASELINE OPTION
CERTIFICATION IMPACTS**

Impact on average Safety Certification Costs											
Certification Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Safety Certification (1st Country) - Freight	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%
Safety Certification (additional Country) - Freight	0.6%	0.8%	1.0%	1.1%	1.3%	1.5%	1.7%	1.9%	2.1%	2.3%	2.5%
Safety Certification (1st Country) - Passenger	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
Safety Certification (additional Country) - Passenger	0.6%	0.8%	1.0%	1.1%	1.3%	1.5%	1.7%	1.9%	2.1%	2.3%	2.5%

Impact on average Safety Certification Timescales											
Certification Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Safety Certification (1st Country) - Freight	0.2%	0.3%	0.3%	0.4%	0.5%	0.5%	0.6%	0.7%	0.7%	0.8%	0.9%
Safety Certification (additional Country) - Freight	0.6%	0.8%	1.0%	1.1%	1.3%	1.5%	1.7%	1.9%	2.1%	2.3%	2.5%
Safety Certification (1st Country) - Passenger	0.2%	0.3%	0.3%	0.4%	0.4%	0.5%	0.6%	0.6%	0.7%	0.8%	0.9%
Safety Certification (additional Country) - Passenger	0.6%	0.8%	1.0%	1.1%	1.3%	1.5%	1.7%	1.9%	2.1%	2.3%	2.5%

Calcs; Current Option

In this worksheet the baseline change in authorisation and certification levels is combined with the calculated option impacts for each authorisation and certification category to produce total costs and average timescales for each authorisation and certification category for any selected option. This is illustrated for each option by screenshots presented in Appendix Figure D.45 to Appendix Figure D.68.

**APPENDIX FIGURE D.45 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET -
BASELINE OPTION (NEW AUTHORISATION COSTS)**

Total Authorisation Costs (€000s)											
New locomotive type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	7,203	6,234	5,472	4,891	4,428	4,042	3,725	3,454	3,219	3,013	2,832
Freight	10,804	9,351	8,208	7,336	6,642	6,064	5,588	5,181	4,828	4,520	4,247
Total	18,007	15,585	13,680	12,227	11,070	10,106	9,313	8,634	8,047	7,533	7,079
New wagon type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533
Total	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533
New Multiple Unit type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	810	702	617	552	500	457	421	391	365	342	321
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	810	702	617	552	500	457	421	391	365	342	321
New Coach type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566
New locomotive type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	10,156	8,602	7,348	6,450	5,805	5,264	4,844	4,483	4,170	3,896	3,653
Freight	15,235	12,903	11,022	9,675	8,707	7,897	7,265	6,724	6,255	5,843	5,480
Total	25,391	21,505	18,369	16,125	14,511	13,161	12,109	11,207	10,424	9,739	9,133
New wagon type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-
New Multiple Unit type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	1,534	1,343	1,195	1,076	979	897	829	770	718	674	634
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	1,534	1,343	1,195	1,076	979	897	829	770	718	674	634
New Coach type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

**APPENDIX FIGURE D.46 SCREENSHOT OF CALCS; CURRENT OPTION
WORKSHEET - BASELINE OPTION (RE-AUTHORISATION COSTS)**

Locomotive type re-authorisation without ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	34,919	33,467	31,836	30,785	30,018	29,248	28,716	28,190	27,669	27,152	26,640
Freight	52,379	50,200	47,753	46,177	45,026	43,871	43,074	42,285	41,503	40,728	39,960
Total	87,298	83,667	79,589	76,962	75,044	73,119	71,790	70,475	69,172	67,880	66,600

Locomotive type re-authorisation with ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	2,241	2,429	2,613	2,857	3,151	3,472	3,856	4,281	4,752	5,274	5,852
Freight	3,361	3,643	3,919	4,286	4,727	5,208	5,783	6,421	7,127	7,910	8,777
Total	5,602	6,072	6,532	7,144	7,878	8,681	9,639	10,702	11,879	13,184	14,629

Number of wagon type re-authorisations (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836
Total	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836

Multiple Unit type re-authorisation without ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	21,305	20,759	20,174	19,729	19,353	18,980	18,666	18,356	18,050	17,748	17,450
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	21,305	20,759	20,174	19,729	19,353	18,980	18,666	18,356	18,050	17,748	17,450

Multiple Unit type re-authorisation with ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	5,672	6,250	6,869	7,597	8,429	9,348	10,398	11,564	12,860	14,301	15,902
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	5,672	6,250	6,869	7,597	8,429	9,348	10,398	11,564	12,860	14,301	15,902

Coach type re-authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624

Locomotive type re-authorisation without ERTMS (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

Locomotive type re-authorisation with ERTMS (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	2,254	2,456	2,662	2,915	3,226	3,567	3,964	4,406	4,895	5,439	6,042
Freight	3,381	3,684	3,993	4,373	4,838	5,351	5,947	6,609	7,343	8,159	9,063
Total	5,635	6,140	6,655	7,288	8,064	8,918	9,911	11,014	12,239	13,598	15,106

Wagon type re-authorisation (additional country)

Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

Multiple Unit type re-authorisation without ERTMS (additional country)

Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

Multiple Unit type re-authorisation with ERTMS (additional country)

Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	4,833	5,380	5,990	6,668	7,423	8,264	9,200	10,242	11,402	12,694	14,132
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	4,833	5,380	5,990	6,668	7,423	8,264	9,200	10,242	11,402	12,694	14,132

Coach type re-authorisation (additional country)

Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

APPENDIX FIGURE D.47 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET - BASELINE OPTION (AVERAGE AUTHORISATION TIMESCALES)

Average Authorisation Timescales (Months/Type authorisation)											
Authorisation Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
New locomotive type authorisation (1st country)	23	23	23	22	22	22	22	22	22	22	22
New wagon type authorisation (1st country)	2	2	2	1	1	1	1	1	1	1	1
New Multiple Unit type authorisation (1st country)	23	23	23	22	22	22	22	22	22	22	22
New Coach type authorisation (1st country)	23	23	23	23	22	22	22	22	22	22	22
New locomotive type authorisation (additional country)	10	10	10	9	9	9	9	9	9	9	9
New wagon type authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-
New Multiple Unit type authorisation (additional country)	7	7	7	7	7	7	7	7	7	7	7
New Coach type authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-
Locomotive type re-authorisation without ERTMS (1st country)	11	11	11	10	10	10	10	10	10	10	10
Locomotive type re-authorisation with ERTMS (1st country)	12	11	11	11	11	11	11	11	11	11	11
Number of wagon type re-authorisations (1st country)	1	1	1	1	1	1	1	1	1	1	1
Multiple Unit type re-authorisation without ERTMS (1st country)	23	23	23	22	22	22	22	22	22	22	22
Multiple Unit type re-authorisation with ERTMS (1st country)	26	26	25	25	25	25	25	25	25	25	25
Coach type re-authorisation (1st country)	23	23	22	22	22	22	22	22	22	22	22
Locomotive type re-authorisation without ERTMS (additional country)	-	-	-	-	-	-	-	-	-	-	-
Locomotive type re-authorisation with ERTMS (additional country)	8	8	8	8	8	8	8	8	8	8	8
Wagon type re-authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-
Multiple Unit type re-authorisation without ERTMS (additional country)	-	-	-	-	-	-	-	-	-	-	-
Multiple Unit type re-authorisation with ERTMS (additional country)	6	6	6	6	6	6	6	6	6	6	6
Coach type re-authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-

APPENDIX FIGURE D.48 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET - BASELINE OPTION (TOTAL SAFETY CERTIFICATION COSTS AND AVERAGE TIMESCALES)

Total Safety Certification Costs (€000s)											
Certification Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Safety Certification (1st Country) - Freight	1,276	1,276	1,276	1,276	1,276	1,276	1,276	1,276	1,276	1,276	1,276
Safety Certification (additional Country) - Freight	365	365	364	363	363	362	362	361	360	359	358
Safety Certification (1st Country) - Passenger	966	966	966	966	966	966	966	966	966	966	966
Safety Certification (additional Country) - Passenger	133	133	132	132	132	132	131	131	131	131	130

Average Safety Certification Timescales											
Certification Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Safety Certification (1st Country) - Freight	5	5	5	5	5	5	5	5	5	5	5
Safety Certification (additional Country) - Freight	5	5	5	5	5	5	5	5	5	5	5
Safety Certification (1st Country) - Passenger	5	5	5	5	5	5	5	5	5	5	5
Safety Certification (additional Country) - Passenger	6	6	6	6	6	6	6	6	6	6	6

Option 2

APPENDIX FIGURE D.49 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET - OPTION 2 (NEW AUTHORISATION COSTS)

Total Authorisation Costs (€000s)											
New locomotive type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	7,203	6,234	5,451	4,850	4,367	3,961	3,647	3,378	3,148	2,947	2,769
Freight	10,804	9,351	8,177	7,275	6,551	5,942	5,471	5,067	4,722	4,420	4,154
Total	18,007	15,585	13,628	12,125	10,918	9,903	9,118	8,445	7,870	7,367	6,923
New wagon type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533
Total	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533
New Multiple Unit type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	810	702	614	546	492	446	411	381	355	332	312
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	810	702	614	546	492	446	411	381	355	332	312
New Coach type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566
New locomotive type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	10,156	8,602	7,218	6,196	5,428	4,761	4,359	4,012	3,724	3,470	3,246
Freight	15,235	12,903	10,827	9,295	8,141	7,142	6,539	6,018	5,585	5,205	4,868
Total	25,391	21,505	18,045	15,491	13,569	11,903	10,898	10,031	9,309	8,675	8,114
New wagon type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-
New Multiple Unit type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	1,534	1,343	1,195	1,076	979	897	829	770	718	674	634
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	1,534	1,343	1,195	1,076	979	897	829	770	718	674	634
New Coach type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

APPENDIX FIGURE D.50 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET - OPTION 2 (RE-AUTHORISATION COSTS)

Locomotive type re-authorisation without ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	34,919	33,467	31,441	29,937	28,650	27,282	26,699	26,114	25,625	25,140	24,660
Freight	52,379	50,200	47,161	44,905	42,975	40,922	40,048	39,170	38,437	37,710	36,990
Total	87,298	83,667	78,601	74,842	71,625	68,204	66,747	65,284	64,062	62,851	61,649

Locomotive type re-authorisation with ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	2,241	2,429	2,580	2,779	3,008	3,239	3,585	3,965	4,401	4,883	5,417
Freight	3,361	3,643	3,871	4,168	4,511	4,858	5,377	5,948	6,601	7,324	8,125
Total	5,602	6,072	6,451	6,947	7,519	8,097	8,962	9,913	11,002	12,207	13,541

Number of wagon type re-authorisations (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836
Total	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836

Multiple Unit type re-authorisation without ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	21,305	20,759	20,082	19,530	19,032	18,518	18,192	17,868	17,570	17,276	16,985
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	21,305	20,759	20,082	19,530	19,032	18,518	18,192	17,868	17,570	17,276	16,985

Multiple Unit type re-authorisation with ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	5,672	6,250	6,838	7,521	8,289	9,121	10,134	11,256	12,518	13,920	15,478
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	5,672	6,250	6,838	7,521	8,289	9,121	10,134	11,256	12,518	13,920	15,478

Coach type re-authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624

Locomotive type re-authorisation without ERTMS (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

Locomotive type re-authorisation with ERTMS (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	2,254	2,456	2,620	2,813	3,039	3,264	3,615	4,003	4,441	4,926	5,462
Freight	3,381	3,684	3,930	4,219	4,558	4,895	5,423	6,004	6,661	7,389	8,193
Total	5,635	6,140	6,550	7,032	7,597	8,159	9,038	10,007	11,102	12,314	13,656

Wagon type re-authorisation (additional country)

Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

Multiple Unit type re-authorisation without ERTMS (additional country)

Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

Multiple Unit type re-authorisation with ERTMS (additional country)

Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	4,833	5,380	5,990	6,668	7,423	8,264	9,200	10,242	11,402	12,694	14,132
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	4,833	5,380	5,990	6,668	7,423	8,264	9,200	10,242	11,402	12,694	14,132

Coach type re-authorisation (additional country)

Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

APPENDIX FIGURE D.51 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET - OPTION 2 (AVERAGE AUTHORISATION TIMESCALES)

Average Authorisation Timescales (Months/Type authorisation)											
Authorisation Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
New locomotive type authorisation (1st country)	23	23	22	22	22	22	21	21	21	21	21
New wagon type authorisation (1st country)	2	2	1	1	1	1	1	1	1	1	1
New Multiple Unit type authorisation (1st country)	23	23	22	22	22	21	21	21	21	21	21
New Coach type authorisation (1st country)	23	23	23	22	22	22	22	22	21	21	21
New locomotive type authorisation (additional country)	10	10	9	9	9	8	8	8	8	8	8
New wagon type authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-
New Multiple Unit type authorisation (additional country)	7	7	7	7	7	7	7	7	7	7	7
New Coach type authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-
Locomotive type re-authorisation without ERTMS (1st country)	11	11	10	10	10	10	9	9	9	9	9
Locomotive type re-authorisation with ERTMS (1st country)	12	11	11	11	11	10	10	10	10	10	10
Number of wagon type re-authorisations (1st country)	1	1	1	1	1	1	1	1	1	1	1
Multiple Unit type re-authorisation without ERTMS (1st country)	23	23	23	22	22	22	22	21	21	21	21
Multiple Unit type re-authorisation with ERTMS (1st country)	26	26	25	25	25	24	24	24	24	24	24
Coach type re-authorisation (1st country)	23	23	22	22	22	21	21	21	21	21	21
Locomotive type re-authorisation without ERTMS (additional country)	-	-	-	-	-	-	-	-	-	-	-
Locomotive type re-authorisation with ERTMS (additional country)	8	8	8	8	8	8	8	8	8	8	8
Wagon type re-authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-
Multiple Unit type re-authorisation without ERTMS (additional country)	-	-	-	-	-	-	-	-	-	-	-
Multiple Unit type re-authorisation with ERTMS (additional country)	6	6	6	6	6	6	6	6	6	6	6
Coach type re-authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-

APPENDIX FIGURE D.52 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET - OPTION 2 (TOTAL SAFETY CERTIFICATION COSTS AND AVERAGE TIMESCALES)

Total Safety Certification Costs (€000s)											
Certification Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Safety Certification (1st Country) - Freight	1,276	1,276	1,276	1,275	1,274	1,274	1,273	1,273	1,273	1,273	1,273
Safety Certification (additional Country) - Freight	365	365	345	323	299	272	250	225	201	175	147
Safety Certification (1st Country) - Passenger	966	966	966	965	965	964	964	964	964	964	964
Safety Certification (additional Country) - Passenger	133	133	125	117	109	99	91	82	73	64	53

Average Safety Certification Timescales											
Certification Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Safety Certification (1st Country) - Freight	5	5	5	5	5	5	5	5	5	5	5
Safety Certification (additional Country) - Freight	5	5	5	4	4	4	3	3	3	2	2
Safety Certification (1st Country) - Passenger	5	5	5	5	5	5	5	5	5	5	5
Safety Certification (additional Country) - Passenger	6	6	6	5	5	4	4	4	3	3	2

Option 3

APPENDIX FIGURE D.53 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET - OPTION 3 (NEW AUTHORISATION COSTS)

Total Authorisation Costs (€000s)											
New locomotive type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	7,203	6,234	5,439	4,824	4,326	3,939	3,614	3,348	3,120	2,920	2,744
Freight	10,804	9,351	8,158	7,235	6,489	5,909	5,422	5,021	4,679	4,380	4,117
Total	18,007	15,585	13,596	12,059	10,815	9,849	9,036	8,369	7,799	7,301	6,861
New wagon type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533
Total	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533
New Multiple Unit type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	810	702	612	542	486	443	406	376	351	329	309
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	810	702	612	542	486	443	406	376	351	329	309
New Coach type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566
New locomotive type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	10,156	8,602	7,173	6,103	5,279	4,681	4,222	3,873	3,581	3,323	3,093
Freight	15,235	12,903	10,760	9,155	7,918	7,021	6,333	5,810	5,372	4,985	4,639
Total	25,391	21,505	17,934	15,258	13,197	11,702	10,555	9,683	8,953	8,308	7,732
New wagon type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-
New Multiple Unit type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	1,534	1,343	1,195	1,076	979	897	829	770	718	674	634
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	1,534	1,343	1,195	1,076	979	897	829	770	718	674	634
New Coach type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

APPENDIX FIGURE D.54 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET - OPTION 3 (RE-AUTHORISATION COSTS)

Locomotive type re-authorisation without ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	34,919	33,467	31,198	29,390	27,719	26,757	25,855	25,283	24,807	24,335	23,867
Freight	52,379	50,200	46,797	44,085	41,578	40,136	38,783	37,925	37,211	36,503	35,801
Total	87,298	83,667	77,995	73,474	69,297	66,893	64,638	63,208	62,018	60,839	59,669

Locomotive type re-authorisation with ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	2,241	2,429	2,561	2,728	2,910	3,177	3,471	3,839	4,260	4,726	5,243
Freight	3,361	3,643	3,841	4,092	4,365	4,765	5,207	5,759	6,390	7,090	7,864
Total	5,602	6,072	6,401	6,820	7,274	7,942	8,679	9,598	10,651	11,816	13,106

Number of wagon type re-authorisations (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836
Total	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836

Multiple Unit type re-authorisation without ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	21,305	20,759	20,025	19,401	18,813	18,395	17,994	17,673	17,378	17,086	16,799
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	21,305	20,759	20,025	19,401	18,813	18,395	17,994	17,673	17,378	17,086	16,799

Multiple Unit type re-authorisation with ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	5,672	6,250	6,818	7,471	8,193	9,060	10,023	11,134	12,381	13,768	15,308
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	5,672	6,250	6,818	7,471	8,193	9,060	10,023	11,134	12,381	13,768	15,308

Coach type re-authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624

Locomotive type re-authorisation without ERTMS (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

Locomotive type re-authorisation with ERTMS (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	2,254	2,456	2,609	2,784	2,982	3,226	3,538	3,908	4,326	4,784	5,288
Freight	3,381	3,684	3,913	4,175	4,472	4,839	5,307	5,863	6,489	7,177	7,932
Total	5,635	6,140	6,521	6,959	7,454	8,065	8,844	9,771	10,814	11,961	13,221

Wagon type re-authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

Multiple Unit type re-authorisation without ERTMS (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

Multiple Unit type re-authorisation with ERTMS (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	4,833	5,380	5,990	6,668	7,423	8,264	9,200	10,242	11,402	12,694	14,132
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	4,833	5,380	5,990	6,668	7,423	8,264	9,200	10,242	11,402	12,694	14,132

Coach type re-authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

APPENDIX FIGURE D.55 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET - OPTION 3 (AVERAGE AUTHORISATION TIMESCALES)

Average Authorisation Timescales (Months/Type authorisation)											
Authorisation Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
New locomotive type authorisation (1st country)	23	23	22	22	22	21	21	21	21	21	21
New wagon type authorisation (1st country)	2	2	1	1	1	1	1	1	1	1	1
New Multiple Unit type authorisation (1st country)	23	23	22	22	21	21	21	21	21	21	21
New Coach type authorisation (1st country)	23	23	23	22	22	21	21	21	21	21	21
New locomotive type authorisation (additional country)	10	10	9	9	8	8	8	8	8	8	8
New wagon type authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-
New Multiple Unit type authorisation (additional country)	7	7	7	7	7	7	7	7	7	7	7
New Coach type authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-
Locomotive type re-authorisation without ERTMS (1st country)	11	11	10	10	10	9	9	9	9	9	9
Locomotive type re-authorisation with ERTMS (1st country)	12	11	11	11	10	10	10	10	10	10	10
Number of wagon type re-authorisations (1st country)	1	1	1	1	1	1	1	1	1	1	1
Multiple Unit type re-authorisation without ERTMS (1st country)	23	23	22	22	22	21	21	21	21	21	21
Multiple Unit type re-authorisation with ERTMS (1st country)	26	26	25	25	24	24	24	24	24	24	24
Coach type re-authorisation (1st country)	23	23	22	22	21	21	21	21	21	21	21
Locomotive type re-authorisation without ERTMS (additional country)	-	-	-	-	-	-	-	-	-	-	-
Locomotive type re-authorisation with ERTMS (additional country)	8	8	8	8	8	8	8	8	8	8	8
Wagon type re-authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-
Multiple Unit type re-authorisation without ERTMS (additional country)	-	-	-	-	-	-	-	-	-	-	-
Multiple Unit type re-authorisation with ERTMS (additional country)	6	6	6	6	6	6	6	6	6	6	6
Coach type re-authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-

APPENDIX FIGURE D.56 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET - OPTION 3 (TOTAL SAFETY CERTIFICATION COSTS AND AVERAGE TIMESCALES)

Total Safety Certification Costs (€000s)											
Certification Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Safety Certification (1st Country) - Freight	1,276	1,276	1,275	1,274	1,273	1,273	1,272	1,272	1,271	1,271	1,271
Safety Certification (additional Country) - Freight	365	365	355	317	275	245	203	184	144	102	55
Safety Certification (1st Country) - Passenger	966	966	965	965	964	964	963	963	963	963	963
Safety Certification (additional Country) - Passenger	133	133	129	115	100	89	74	67	53	37	20

Average Safety Certification Timescales											
Certification Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Safety Certification (1st Country) - Freight	5	5	5	5	5	5	5	5	5	5	5
Safety Certification (additional Country) - Freight	5	5	5	4	4	3	3	2	2	1	1
Safety Certification (1st Country) - Passenger	5	5	5	5	5	5	5	5	5	5	5
Safety Certification (additional Country) - Passenger	6	6	6	5	4	4	3	3	2	2	1

Option 4

APPENDIX FIGURE D.57 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET - OPTION 4 (NEW AUTHORISATION COSTS)

Total Authorisation Costs (€000s)											
New locomotive type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	7,203	6,234	5,419	4,790	4,281	3,851	3,509	3,211	2,950	2,761	2,595
Freight	10,804	9,351	8,129	7,185	6,422	5,777	5,263	4,817	4,425	4,142	3,892
Total	18,007	15,585	13,548	11,974	10,703	9,629	8,772	8,029	7,375	6,903	6,487
New wagon type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533
Total	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533
New Multiple Unit type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	810	702	609	538	480	430	392	358	328	307	288
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	810	702	609	538	480	430	392	358	328	307	288
New Coach type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566
New locomotive type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	10,156	8,602	7,095	5,964	5,097	4,303	3,755	3,265	2,852	2,647	2,463
Freight	15,235	12,903	10,642	8,946	7,645	6,455	5,633	4,898	4,279	3,970	3,694
Total	25,391	21,505	17,736	14,911	12,742	10,759	9,388	8,163	7,131	6,617	6,157
New wagon type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-
New Multiple Unit type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	1,534	1,343	1,195	1,076	979	897	829	770	718	674	634
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	1,534	1,343	1,195	1,076	979	897	829	770	718	674	634
New Coach type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

APPENDIX FIGURE D.58 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET - OPTION 4 (RE-AUTHORISATION COSTS)

Locomotive type re-authorisation without ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	34,919	33,467	30,832	28,685	26,718	24,629	23,126	21,553	19,902	19,507	19,114
Freight	52,379	50,200	46,248	43,028	40,076	36,944	34,689	32,329	29,853	29,260	28,672
Total	87,298	83,667	77,081	71,713	66,794	61,573	57,815	53,882	49,755	48,767	47,786

Locomotive type re-authorisation with ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	2,241	2,429	2,530	2,663	2,805	2,924	3,105	3,273	3,418	3,789	4,199
Freight	3,361	3,643	3,796	3,994	4,207	4,386	4,658	4,909	5,127	5,683	6,298
Total	5,602	6,072	6,326	6,656	7,012	7,310	7,763	8,182	8,545	9,472	10,496

Number of wagon type re-authorisations (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836
Total	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836

Multiple Unit type re-authorisation without ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	21,305	20,759	19,939	19,236	18,578	17,895	17,353	16,797	16,226	15,952	15,682
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	21,305	20,759	19,939	19,236	18,578	17,895	17,353	16,797	16,226	15,952	15,682

Multiple Unit type re-authorisation with ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	5,672	6,250	6,789	7,407	8,091	8,814	9,666	10,582	11,560	12,854	14,291
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	5,672	6,250	6,789	7,407	8,091	8,814	9,666	10,582	11,560	12,854	14,291

Coach type re-authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624

Locomotive type re-authorisation without ERTMS (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

Locomotive type re-authorisation with ERTMS (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	2,254	2,456	2,589	2,740	2,911	3,049	3,274	3,498	3,789	4,194	4,640
Freight	3,381	3,684	3,883	4,110	4,367	4,574	4,911	5,248	5,683	6,291	6,960
Total	5,635	6,140	6,471	6,850	7,279	7,623	8,184	8,746	9,472	10,486	11,600

Wagon type re-authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

Multiple Unit type re-authorisation without ERTMS (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

Multiple Unit type re-authorisation with ERTMS (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	4,833	5,380	5,990	6,668	7,423	8,264	9,200	10,242	11,402	12,694	14,132
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	4,833	5,380	5,990	6,668	7,423	8,264	9,200	10,242	11,402	12,694	14,132

Coach type re-authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

APPENDIX FIGURE D.59 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET - OPTION 4 (AVERAGE AUTHORISATION TIMESCALES)

Average Authorisation Timescales (Months/Type authorisation)											
Authorisation Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
New locomotive type authorisation (1st country)	23	23	22	22	21	21	20	20	19	19	19
New wagon type authorisation (1st country)	2	2	1	1	1	1	1	1	1	1	1
New Multiple Unit type authorisation (1st country)	23	23	22	22	21	21	20	20	19	19	19
New Coach type authorisation (1st country)	23	23	22	22	21	21	20	20	19	19	19
New locomotive type authorisation (additional country)	10	10	9	9	8	7	7	7	6	6	6
New wagon type authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-
New Multiple Unit type authorisation (additional country)	7	7	7	7	7	7	7	7	7	7	7
New Coach type authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-
Locomotive type re-authorisation without ERTMS (1st country)	11	11	10	10	9	9	8	8	7	7	7
Locomotive type re-authorisation with ERTMS (1st country)	12	11	11	10	10	10	9	9	9	9	9
Number of wagon type re-authorisations (1st country)	1	1	1	1	1	1	1	1	1	1	1
Multiple Unit type re-authorisation without ERTMS (1st country)	23	23	22	22	21	21	20	20	19	19	19
Multiple Unit type re-authorisation with ERTMS (1st country)	26	26	25	24	24	23	23	22	22	22	21
Coach type re-authorisation (1st country)	23	23	22	22	21	20	20	20	19	19	19
Locomotive type re-authorisation without ERTMS (additional country)	-	-	-	-	-	-	-	-	-	-	-
Locomotive type re-authorisation with ERTMS (additional country)	8	8	8	8	8	8	8	8	8	8	8
Wagon type re-authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-
Multiple Unit type re-authorisation without ERTMS (additional country)	-	-	-	-	-	-	-	-	-	-	-
Multiple Unit type re-authorisation with ERTMS (additional country)	6	6	6	6	6	6	6	6	6	6	6
Coach type re-authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-

APPENDIX FIGURE D.60 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET - OPTION 4 (TOTAL SAFETY CERTIFICATION COSTS AND AVERAGE TIMESCALES)

Total Safety Certification Costs (€000s)											
Certification Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Safety Certification (1st Country) - Freight	1,276	1,276	1,275	1,273	1,271	1,269	1,267	1,265	1,262	1,262	1,262
Safety Certification (additional Country) - Freight	365	365	360	317	269	215	154	87	11	10	9
Safety Certification (1st Country) - Passenger	966	966	965	964	963	962	961	959	958	958	958
Safety Certification (additional Country) - Passenger	133	133	131	115	98	78	56	32	4	4	3

Average Safety Certification Timescales											
Certification Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Safety Certification (1st Country) - Freight	5	5	5	5	5	5	5	5	4	4	4
Safety Certification (additional Country) - Freight	5	5	5	4	4	3	2	1	0	0	0
Safety Certification (1st Country) - Passenger	5	5	5	5	5	5	5	4	4	4	4
Safety Certification (additional Country) - Passenger	6	6	6	5	4	3	2	1	0	0	0

Option 5

APPENDIX FIGURE D.61 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET - OPTION 5 (NEW AUTHORISATION COSTS)

Total Authorisation Costs (€000s)											
New locomotive type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	7,203	6,234	5,365	4,687	4,134	3,662	3,286	3,032	2,828	2,650	2,493
Freight	10,804	9,351	8,047	7,031	6,201	5,493	4,928	4,548	4,242	3,975	3,739
Total	18,007	15,585	13,412	11,718	10,335	9,155	8,214	7,580	7,070	6,624	6,232
New wagon type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533
Total	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533
New Multiple Unit type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	810	702	602	524	460	404	361	334	312	293	276
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	810	702	602	524	460	404	361	334	312	293	276
New Coach type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566
New locomotive type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	10,156	8,602	6,872	5,544	4,495	3,563	3,163	2,935	2,738	2,565	2,413
Freight	15,235	12,903	10,309	8,317	6,742	5,345	4,745	4,403	4,107	3,848	3,620
Total	25,391	21,505	17,181	13,861	11,237	8,908	7,909	7,338	6,845	6,413	6,033
New wagon type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-
New Multiple Unit type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	1,534	1,343	1,195	1,076	979	897	829	770	718	674	634
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	1,534	1,343	1,195	1,076	979	897	829	770	718	674	634
New Coach type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

APPENDIX FIGURE D.62 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET - OPTION 5 (RE-AUTHORISATION COSTS)

Locomotive type re-authorisation without ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	34,919	33,467	29,803	26,554	23,404	20,047	17,352	16,611	16,351	16,095	15,844
Freight	52,379	50,200	44,705	39,831	35,107	30,071	26,027	24,916	24,527	24,143	23,766
Total	87,298	83,667	74,508	66,385	58,511	50,118	43,379	41,527	40,878	40,239	39,610

Locomotive type re-authorisation with ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	2,241	2,429	2,446	2,465	2,457	2,380	2,330	2,522	2,808	3,126	3,480
Freight	3,361	3,643	3,669	3,697	3,685	3,570	3,495	3,784	4,212	4,689	5,220
Total	5,602	6,072	6,115	6,162	6,142	5,950	5,824	6,306	7,020	7,815	8,700

Number of wagon type re-authorisations (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836
Total	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836

Multiple Unit type re-authorisation without ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	21,305	20,759	19,697	18,735	17,800	16,819	15,991	15,608	15,364	15,124	14,887
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	21,305	20,759	19,697	18,735	17,800	16,819	15,991	15,608	15,364	15,124	14,887

Multiple Unit type re-authorisation with ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	5,672	6,250	6,707	7,215	7,752	8,284	8,907	9,833	10,946	12,186	13,566
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	5,672	6,250	6,707	7,215	7,752	8,284	8,907	9,833	10,946	12,186	13,566

Coach type re-authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624

Locomotive type re-authorisation without ERTMS (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

Locomotive type re-authorisation with ERTMS (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	2,254	2,456	2,532	2,608	2,680	2,741	3,021	3,363	3,744	4,168	4,640
Freight	3,381	3,684	3,798	3,912	4,019	4,112	4,531	5,045	5,616	6,252	6,960
Total	5,635	6,140	6,331	6,520	6,699	6,853	7,552	8,408	9,360	10,420	11,600

Wagon type re-authorisation (additional country)

Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

Multiple Unit type re-authorisation without ERTMS (additional country)

Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

Multiple Unit type re-authorisation with ERTMS (additional country)

Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	4,833	5,380	5,990	6,668	7,423	8,264	9,200	10,242	11,402	12,694	14,132
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	4,833	5,380	5,990	6,668	7,423	8,264	9,200	10,242	11,402	12,694	14,132

Coach type re-authorisation (additional country)

Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

APPENDIX FIGURE D.63 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET - OPTION 5 (AVERAGE AUTHORISATION TIMESCALES)

Average Authorisation Timescales (Months/Type authorisation)											
Authorisation Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
New locomotive type authorisation (1st country)	23	23	22	21	20	19	18	18	18	18	18
New wagon type authorisation (1st country)	2	2	1	1	1	1	1	1	1	1	1
New Multiple Unit type authorisation (1st country)	23	23	22	21	20	19	18	18	18	18	18
New Coach type authorisation (1st country)	23	23	22	21	20	19	18	18	18	18	18
New locomotive type authorisation (additional country)	10	10	9	8	7	6	6	6	6	6	6
New wagon type authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-
New Multiple Unit type authorisation (additional country)	7	7	7	7	7	7	7	7	7	7	7
New Coach type authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-
Locomotive type re-authorisation without ERTMS (1st country)	11	11	10	9	8	7	6	6	6	6	6
Locomotive type re-authorisation with ERTMS (1st country)	12	11	11	10	9	9	8	8	8	8	8
Number of wagon type re-authorisations (1st country)	1	1	1	1	1	1	1	1	1	1	1
Multiple Unit type re-authorisation without ERTMS (1st country)	23	23	22	21	20	19	18	18	18	18	18
Multiple Unit type re-authorisation with ERTMS (1st country)	26	26	25	24	22	21	20	20	20	20	20
Coach type re-authorisation (1st country)	23	23	22	21	20	19	18	18	18	18	18
Locomotive type re-authorisation without ERTMS (additional country)	-	-	-	-	-	-	-	-	-	-	-
Locomotive type re-authorisation with ERTMS (additional country)	8	8	8	8	8	8	8	8	8	8	8
Wagon type re-authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-
Multiple Unit type re-authorisation without ERTMS (additional country)	-	-	-	-	-	-	-	-	-	-	-
Multiple Unit type re-authorisation with ERTMS (additional country)	6	6	6	6	6	6	6	6	6	6	6
Coach type re-authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-

APPENDIX FIGURE D.64 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET - OPTION 5 (TOTAL SAFETY CERTIFICATION COSTS AND AVERAGE TIMESCALES)

Total Safety Certification Costs (€000s)											
Certification Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Safety Certification (1st Country) - Freight	1,276	1,276	1,273	1,269	1,265	1,260	1,255	1,250	1,244	1,243	1,243
Safety Certification (additional Country) - Freight	365	365	325	282	234	182	123	59	-	-	-
Safety Certification (1st Country) - Passenger	966	966	964	962	959	957	954	950	947	947	947
Safety Certification (additional Country) - Passenger	133	133	118	103	85	66	45	21	-	-	-

Average Safety Certification Timescales											
Certification Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Safety Certification (1st Country) - Freight	5	5	5	5	5	4	4	4	3	3	3
Safety Certification (additional Country) - Freight	5	5	4	4	3	2	2	1	-	-	-
Safety Certification (1st Country) - Passenger	5	5	5	5	4	4	4	4	3	3	3
Safety Certification (additional Country) - Passenger	6	6	5	5	4	3	2	1	-	-	-

Option 6

APPENDIX FIGURE D.65 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET - OPTION 6 (NEW AUTHORISATION COSTS)

Total Authorisation Costs (€000s)											
New locomotive type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	7,145	6,097	5,267	4,616	4,166	3,790	3,486	3,225	3,006	2,814	2,644
Freight	10,717	9,146	7,900	6,924	6,249	5,685	5,230	4,838	4,509	4,220	3,966
Total	17,862	15,243	13,167	11,541	10,415	9,476	8,716	8,064	7,514	7,034	6,610
New wagon type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533
Total	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533	5,533
New Multiple Unit type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	802	684	590	515	465	423	390	361	336	315	296
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	802	684	590	515	465	423	390	361	336	315	296
New Coach type authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566
New locomotive type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	9,918	8,040	6,504	5,322	4,727	4,228	3,861	3,544	3,294	3,075	2,882
Freight	14,878	12,060	9,756	7,983	7,091	6,341	5,792	5,316	4,941	4,613	4,323
Total	24,796	20,099	16,260	13,305	11,818	10,569	9,653	8,860	8,236	7,688	7,204
New wagon type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-
New Multiple Unit type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	1,534	1,343	1,195	1,076	979	897	829	770	718	674	634
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	1,534	1,343	1,195	1,076	979	897	829	770	718	674	634
New Coach type authorisation (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

APPENDIX FIGURE D.66 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET - OPTION 6 (RE-AUTHORISATION COSTS)

Locomotive type re-authorisation without ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	34,041	31,131	27,944	25,084	24,117	23,143	22,543	21,933	21,509	21,089	20,672
Freight	51,061	46,697	41,916	37,625	36,176	34,715	33,815	32,899	32,264	31,633	31,007
Total	85,102	77,828	69,860	62,709	60,293	57,859	56,359	54,831	53,773	52,722	51,679

Locomotive type re-authorisation with ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	2,184	2,259	2,293	2,328	2,532	2,748	3,027	3,330	3,694	4,096	4,541
Freight	3,276	3,389	3,440	3,492	3,798	4,121	4,540	4,996	5,541	6,144	6,811
Total	5,461	5,648	5,734	5,821	6,329	6,869	7,567	8,326	9,235	10,240	11,351

Number of wagon type re-authorisations (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836
Total	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836	7,836

Multiple Unit type re-authorisation without ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	21,094	20,196	19,238	18,358	17,934	17,511	17,181	16,852	16,569	16,290	16,015
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	21,094	20,196	19,238	18,358	17,934	17,511	17,181	16,852	16,569	16,290	16,015

Multiple Unit type re-authorisation with ERTMS (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	5,616	6,080	6,550	7,069	7,810	8,625	9,570	10,616	11,805	13,126	14,594
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	5,616	6,080	6,550	7,069	7,810	8,625	9,570	10,616	11,805	13,126	14,594

Coach type re-authorisation (1st country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624	9,624

Locomotive type re-authorisation without ERTMS (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

Locomotive type re-authorisation with ERTMS (additional country)											
Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	2,217	2,343	2,449	2,563	2,813	3,084	3,412	3,772	4,190	4,654	5,168
Freight	3,325	3,515	3,674	3,844	4,219	4,626	5,118	5,658	6,285	6,981	7,752
Total	5,541	5,858	6,123	6,406	7,032	7,710	8,530	9,431	10,476	11,635	12,921

Wagon type re-authorisation (additional country)

Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

Multiple Unit type re-authorisation without ERTMS (additional country)

Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

Multiple Unit type re-authorisation with ERTMS (additional country)

Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	4,833	5,380	5,990	6,668	7,423	8,264	9,200	10,242	11,402	12,694	14,132
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	4,833	5,380	5,990	6,668	7,423	8,264	9,200	10,242	11,402	12,694	14,132

Coach type re-authorisation (additional country)

Sector	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	-	-	-	-	-	-	-	-	-	-	-
Freight	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

APPENDIX FIGURE D.67 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET - OPTION 6 (AVERAGE AUTHORISATION TIMESCALES)

Average Authorisation Timescales (Months/Type authorisation)											
Authorisation Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
New locomotive type authorisation (1st country)	23	22	21	20	20	20	20	20	20	20	20
New wagon type authorisation (1st country)	2	1	1	1	1	1	1	1	1	1	1
New Multiple Unit type authorisation (1st country)	23	22	21	20	20	20	20	20	20	20	20
New Coach type authorisation (1st country)	23	22	21	21	20	20	20	20	20	20	20
New locomotive type authorisation (additional country)	10	9	8	8	8	7	7	7	7	7	7
New wagon type authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-
New Multiple Unit type authorisation (additional country)	7	7	7	7	7	7	7	7	7	7	7
New Coach type authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-
Locomotive type re-authorisation without ERTMS (1st country)	11	10	9	9	8	8	8	8	8	8	8
Locomotive type re-authorisation with ERTMS (1st country)	11	11	10	10	10	9	9	9	9	9	9
Number of wagon type re-authorisations (1st country)	1	1	1	1	1	1	1	1	1	1	1
Multiple Unit type re-authorisation without ERTMS (1st country)	23	22	21	21	20	20	20	20	20	20	20
Multiple Unit type re-authorisation with ERTMS (1st country)	26	25	24	23	23	22	22	22	22	22	22
Coach type re-authorisation (1st country)	23	22	21	20	20	20	20	20	20	20	20
Locomotive type re-authorisation without ERTMS (additional country)	-	-	-	-	-	-	-	-	-	-	-
Locomotive type re-authorisation with ERTMS (additional country)	8	8	8	8	8	8	8	8	8	8	8
Wagon type re-authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-
Multiple Unit type re-authorisation without ERTMS (additional country)	-	-	-	-	-	-	-	-	-	-	-
Multiple Unit type re-authorisation with ERTMS (additional country)	6	6	6	6	6	6	6	6	6	6	6
Coach type re-authorisation (additional country)	-	-	-	-	-	-	-	-	-	-	-

APPENDIX FIGURE D.68 SCREENSHOT OF CALCS; CURRENT OPTION WORKSHEET - OPTION 6 (TOTAL SAFETY CERTIFICATION COSTS AND AVERAGE TIMESCALES)

Total Safety Certification Costs (€000s)											
Certification Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Safety Certification (1st Country) - Freight	1,275	1,273	1,270	1,266	1,266	1,266	1,265	1,265	1,265	1,265	1,265
Safety Certification (additional Country) - Freight	353	331	301	266	263	259	255	250	249	248	247
Safety Certification (1st Country) - Passenger	965	964	962	960	960	960	959	959	959	959	959
Safety Certification (additional Country) - Passenger	129	121	110	98	97	95	94	92	92	91	91

Average Safety Certification Timescales											
Certification Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Safety Certification (1st Country) - Freight	5	5	5	5	5	5	5	5	5	5	5
Safety Certification (additional Country) - Freight	5	4	4	4	4	3	3	3	3	3	3
Safety Certification (1st Country) - Passenger	5	5	5	5	5	4	4	4	4	4	4
Safety Certification (additional Country) - Passenger	6	5	5	4	4	4	4	4	4	4	4

Calcs; All opts

The *Run Options* macro in the *Input; Parameters* worksheet pastes output from the *Calcs; Current Option* worksheet into this worksheet to populate an entire set of costs and timescales for each option.

Calcs; All opts_Inc

This worksheet calculates incremental cost savings and timescale improvements for each option over the baseline

Calcs; High level output & Calcs; High level output_disc

These worksheets calculate summary outputs (e.g. by passenger and freight sectors), including both undiscounted and discounted values.

Results by measure

Impact inputs into the calculator are disaggregated by authorisation and certification category and country type, they are at an option rather than measure level. The compilation of these inputs is discussed in the following 'supporting spreadsheets' section but we have also produced monetary benefit results by measure for each of the non-combined options by running the options through the calculator measure by measure. The Appendix Figure D.69 to Appendix Figure D.73 with benefits presented separately for authorisation and certification. Given the presence of overlaps between measures we have presented each option as a the sum of the individual measures and an 'option package adjustment' In reality the option package adjustment is sometimes a combination of a number of adjustments - these can be seen in more detail in the following 'supporting spreadsheets' section.

APPENDIX FIGURE D.69 COST SAVINGS BY MEASURE - OPTION 2

Option 2: Greater coordination role for the Agency - Authorisation cost savings												
Measure	Total NPV (€m)	Real, undiscounted values (€m) >>										
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
2.1.2: Enhanced "coordination" and supervision role of ERA with respect to NSAs regarding granting vehicle of authorisations and safety certificates, including ensuring their mutual recognition by national authorities.	17.0	0.0	0.0	0.7	1.4	2.3	3.3	3.3	3.3	3.3	3.3	3.4
2.1.B: Enhanced "coordination" and supervision role of ERA with respect to Notified Bodies regarding: type approval; rail vehicles certification; ERTMS certification and accreditation of NoBos.	20.0	0.0	0.0	0.8	1.7	2.8	4.0	4.0	4.0	4.1	4.1	4.2
2.1.6: Control by ERA over the functioning of NSAs (for example by developing guidelines and auditing adherence to them).	7.0	0.0	0.0	0.2	0.4	0.7	1.0	1.3	1.7	1.7	1.7	1.7
4.9: Single vehicle authorisation (setting up European "passport" for vehicles)	1.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3
Option package adjustment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total option impact	45.0	0.0	0.0	1.7	3.6	5.8	8.4	8.7	9.2	9.2	9.4	9.6

Option 2: Greater coordination role for the Agency - Certification cost savings												
Measure	Total NPV (€m)	Real, undiscounted values (€m) >>										
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
2.1.2: Enhanced "coordination" and supervision role of ERA with respect to NSAs regarding granting vehicle of authorisations and safety certificates, including ensuring their mutual recognition by national authorities.	0.89	0.00	0.00	0.03	0.05	0.08	0.12	0.15	0.17	0.21	0.24	0.28
2.1.B: Enhanced "coordination" and supervision role of ERA with respect to Notified Bodies regarding: type approval; rail vehicles certification; ERTMS certification and accreditation of NoBos.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.1.6: Control by ERA over the functioning of NSAs (for example by developing guidelines and auditing adherence to them).	0.06	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
4.9: Single vehicle authorisation (setting up European "passport" for vehicles)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Option package adjustment	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total option impact	0.94	0.00	0.00	0.03	0.06	0.09	0.13	0.16	0.19	0.22	0.26	0.29

APPENDIX FIGURE D.70 COST SAVINGS BY MEASURE - OPTION 3

Option 3: ERA as a one-stop-shop - Authorisation cost savings												
Measure	Total NPV (€m)	Real, undiscounted values (€m) >>										
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
2.1.1a: Migration to a single (common) safety certificate: national authorities issue single safety certificates (mutually recognised by definition)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.2.B: ERA shares the competences with the NSAs regarding granting of safety certificates to the railway undertakings and vehicle authorisations placing into service (a "one stop shop" for safety certificates and vehicle authorisation concept): the decision is taken by the NSA, ERA performs "entry and exit" checks of the application and of the decision.	23.0	0.0	0.0	0.8	1.6	2.6	3.7	5.0	5.0	5.0	5.0	5.1
2.3: ERA as an appeal body for some decisions of NSAs	36.0	0.0	0.0	1.8	4.0	6.7	6.6	6.6	6.6	6.6	6.7	6.8
2.1.B: Enhanced "coordination" and supervision role of ERA with respect to NoBos regarding: type approval; rail vehicles certification; ERTMS certification & accreditation of NoBos.	20.0	0.0	0.0	0.8	1.7	2.8	4.0	4.0	4.0	4.1	4.1	4.2
2.1.6: Control by ERA over the functioning of NSAs (e.g. by developing guidelines & auditing adherence to them).	7.0	0.0	0.0	0.2	0.4	0.7	1.0	1.3	1.7	1.7	1.7	1.7
4.9a: Migration to a single vehicle authorisation (setting up European "passport" for vehicles): national authorities issue single vehicle authorisations (mutually recognised by definition)	1.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.4	0.5
Option package adjustment	-25.0	0.0	0.0	-1.0	-2.1	-3.4	-5.0	-5.0	-5.0	-5.0	-5.0	-5.1
Total option impact	62.0	0.0	0.0	2.6	5.6	9.3	10.4	12.1	12.5	12.7	12.9	13.2

Option 3: ERA as a one-stop-shop - Certification cost savings

Measure	Total NPV (€m)	Real, undiscounted values (€m) >>										
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
2.1.1a: Migration to a single (common) safety certificate: national authorities issue single safety certificates (mutually recognised by definition)	1.00	0.00	0.00	0.00	0.03	0.07	0.11	0.16	0.20	0.26	0.31	0.38
2.2.B: ERA shares the competences with the NSAs regarding granting of safety certificates to the railway undertakings and vehicle authorisations placing into service (a "one stop shop" for safety certificates and vehicle authorisation concept): the decision is taken by the NSA, ERA performs "entry and exit" checks of the application and of the decision.	0.19	0.00	0.00	0.01	0.01	0.02	0.03	0.04	0.04	0.04	0.04	0.04
2.3: ERA as an appeal body for some decisions of NSAs	0.30	0.00	0.00	0.01	0.03	0.06	0.06	0.06	0.06	0.06	0.06	0.06
2.1.B: Enhanced "coordination" and supervision role of ERA with respect to NoBos regarding: type approval; rail vehicles certification; ERTMS certification & accreditation of NoBos.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.1.6: Control by ERA over the functioning of NSAs (e.g. by developing guidelines & auditing adherence to them).	0.06	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
4.9a: Migration to a single vehicle authorisation (setting up European "passport" for vehicles): national authorities issue single vehicle authorisations (mutually recognised by definition)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Option package adjustment	-0.28	0.00	0.00	-0.01	-0.02	-0.03	-0.04	-0.04	-0.07	-0.07	-0.07	-0.07
Total option impact	1.27	0.00	0.00	0.01	0.07	0.13	0.16	0.22	0.25	0.30	0.36	0.42

APPENDIX FIGURE D.71 COST SAVINGS BY MEASURE - OPTION 4

Option 4: ERA and NSAs share competences - Authorisation cost savings

Measure	Total NPV (€m)	Real, undiscounted values (€m) >>										
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
2.2.Z: ERA shares the competences with the NSAs regarding granting of safety certificates to RUs & vehicle authorisations to applicants: a "one stop shop" concept with the NSAs (acting as regional offices of ERA) contributing in the process but the final decision rests with ERA.	100.0	0.0	0.0	2.9	5.9	9.3	12.9	17.0	21.5	26.6	26.8	27.1
2.1.1b: Migration to a single (common) safety certificate: ERA issues single safety certificates	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.1.B: Enhanced "coordination" and supervision role of ERA with respect to NoBos regarding: type approval; rail vehicles certification; ERTMS certification and accreditation of NoBos.	29.0	0.0	0.0	1.1	2.4	3.9	5.7	5.7	5.7	5.7	5.8	5.9
4.9b: Migration to a single vehicle authorisation (setting up European "passport" for vehicles): ERA issues single vehicle authorisations	2.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.4	0.6	0.8	1.1
Option package adjustment	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3	-0.4	-0.6
Total option impact	130.0	0.0	0.0	4.0	8.3	13.2	18.7	22.9	27.6	32.6	33.0	33.4

Option 4: ERA and NSAs share competences - Certification cost savings

Measure	Total NPV (€m)	Real, undiscounted values (€m) >>										
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
2.2.Z: ERA shares the competences with the NSAs regarding granting of safety certificates to RUs & vehicle authorisations to applicants: a "one stop shop" concept with the NSAs (acting as regional offices of ERA) contributing in the process but the final decision rests with ERA.	0.83	0.00	0.00	0.02	0.05	0.08	0.11	0.14	0.18	0.22	0.22	0.22
2.1.1b: Migration to a single (common) safety certificate: ERA issues single safety certificates	1.45	0.00	0.00	0.00	0.05	0.11	0.18	0.25	0.33	0.43	0.43	0.43
2.1.B: Enhanced "coordination" and supervision role of ERA with respect to NoBos regarding: type approval; rail vehicles certification; ERTMS certification and accreditation of NoBos.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.9b: Migration to a single vehicle authorisation (setting up European "passport" for vehicles): ERA issues single vehicle authorisations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Option package adjustment	-0.56	0.00	0.00	-0.02	-0.03	-0.05	-0.07	-0.10	-0.12	-0.15	-0.15	-0.15
Total option impact	1.72	0.00	0.00	0.01	0.07	0.14	0.21	0.30	0.39	0.50	0.50	0.50

APPENDIX FIGURE D.72 COST SAVINGS BY MEASURE - OPTION 5

Option 5: ERA takes over activities of NSAs regarding authorisation and certification - Authorisation cost savings

Measure	Total NPV (€m)	Real, undiscounted values (€m) >>										
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
2.2.C: ERA takes over the competences of the NSAs regarding granting of certificates to RUs & vehicle authorisations	200.0	0.0	0.0	6.8	14.1	22.0	30.7	40.1	45.4	45.2	45.2	45.3
2.1.1b: Migration to a single (common) safety certificate: ERA issues single safety certificates	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.1.B: Enhanced "coordination" and supervision role of ERA with respect to Notified Bodies regarding: type approval; rail vehicles certification; ERTMS certification and accreditation of NoBos.	29.0	0.0	0.0	1.1	2.4	3.9	5.7	5.7	5.7	5.7	5.8	5.9
4.9b: Migration to a single vehicle authorisation (setting up European "passport" for vehicles): ERA issues single vehicle authorisations	3.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.6	0.9	1.2	1.6
Option package adjustment	-20.0	0.0	0.0	0.0	0.0	0.0	-0.3	-2.0	-6.3	-6.7	-7.1	-7.5
Total option impact	212.0	0.0	0.0	7.9	16.5	25.9	36.3	44.1	45.4	45.2	45.2	45.3

Option 5: ERA takes over activities of NSAs regarding authorisation and certification - Certification cost savings

Measure	Total NPV (€m)	Real, undiscounted values (€m) >>										
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
2.2.C: ERA takes over the competences of the NSAs regarding granting of certificates to RUs & vehicle authorisations	1.98	0.00	0.00	0.06	0.12	0.19	0.27	0.36	0.45	0.54	0.54	0.54
2.1.1b: Migration to a single (common) safety certificate: ERA issues single safety certificates	2.05	0.00	0.00	0.06	0.13	0.21	0.29	0.39	0.49	0.49	0.49	0.49
2.1.B: Enhanced "coordination" and supervision role of ERA with respect to Notified Bodies regarding: type approval; rail vehicles certification; ERTMS certification and accreditation of NoBos.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.9b: Migration to a single vehicle authorisation (setting up European "passport" for vehicles): ERA issues single vehicle authorisations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Option package adjustment	-1.97	0.02	0.05	-0.02	-0.10	-0.25	-0.41	-0.59	-0.77	-0.87	-0.86	-0.86
Total option impact	2.06	0.02	0.05	0.09	0.15	0.15	0.16	0.16	0.17	0.17	0.17	0.17

APPENDIX FIGURE D.73 COST SAVINGS BY MEASURE - OPTION 6

Option 6: Horizontal measures - Authorisation cost savings												
Measure	Total NPV (€m)	Real, undiscounted values (€m) >>										
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
3.1: Strengthened action by the Commission in implementing the legislation	47.0	1.5	3.1	5.0	7.2	7.1	7.0	7.0	7.0	7.0	7.1	7.2
3.3: Amendment of the railway directives to enable the adoption by the Commission of implementing measures setting out common principles & practices for the national authorities	34.0	0.0	0.0	1.0	2.2	3.4	4.8	6.4	8.2	8.2	8.3	8.4
4.1.1: Enhanced role of ERA in monitoring & control of implementation of national safety & interoperability legislation	10.0	0.0	0.5	1.0	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
4.1.2: Migrating from national technical & safety rules to EU rules through clear indication of what national rules need to be removed by national authorities with the national authorities tasked with the role of removing them. Also modify the directive with a view to limit/remove the possibility for MS to adopt new national rules	32.0	1.3	2.7	3.2	3.8	4.3	4.9	4.9	4.9	4.9	4.9	5.0
4.2: Enhanced role of ERA in dissemination of railway-related information and training.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.3: Enhanced role of ERA in providing advice and support for Member States and other stakeholders in implementing EU legislation on safety & interoperability	22.0	0.7	1.5	2.3	3.4	3.3	3.3	3.3	3.3	3.3	3.3	3.4
4.6: Communication from the Commission regarding guidelines on the interpretation of specific EU laws & decisions (including TSIs)	21.0	0.0	0.9	2.0	3.4	3.3	3.3	3.3	3.3	3.3	3.3	3.4
4.7: Enhanced role of ERA in identifying potential spare parts to be standardised and coordination of industry activities in this area	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Option package adjustment	-10.0	0.0	0.4	0.3	0.3	-0.5	-1.3	-2.2	-3.3	-3.3	-3.3	-3.4
Total option impact	156.0	3.4	9.0	15.0	21.9	22.8	23.7	24.3	25.0	25.1	25.3	25.5

Option 6: Horizontal measures - Certification cost savings												
Measure	Total NPV (€m)	Real, undiscounted values (€m) >>										
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
3.1: Strengthened action by the Commission in implementing the legislation	0.43	0.01	0.03	0.04	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
3.3: Amendment of the railway directives to enable the adoption by the Commission of implementing measures setting out common principles & practices for the national authorities	0.25	0.00	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.06	0.06	0.06
4.1.1: Enhanced role of ERA in monitoring & control of implementation of national safety & interoperability legislation	0.09	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
4.1.2: Migrating from national technical & safety rules to EU rules through clear indication of what national rules need to be removed by national authorities with the national authorities tasked with the role of removing them. Also modify the directive with a view to limit/remove the possibility for MS to adopt new national rules	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.2: Enhanced role of ERA in dissemination of railway-related information and training.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.3: Enhanced role of ERA in providing advice and support for Member States and other stakeholders in implementing EU legislation on safety & interoperability	0.18	0.01	0.01	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
4.6: Communication from the Commission regarding guidelines on the interpretation of specific EU laws & decisions (including TSIs)	0.17	0.00	0.01	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
4.7: Enhanced role of ERA in identifying potential spare parts to be standardised and coordination of industry activities in this area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Option package adjustment	-0.10	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.02	-0.03	-0.03	-0.03	-0.03
Total option impact	1.02	0.02	0.05	0.09	0.15	0.15	0.16	0.16	0.17	0.17	0.17	0.17

Supporting spreadsheets

The impact assessment calculator is supported by a number of spreadsheets which provide inputs to feed into the calculator. Of particular importance is the separate *Option Impacts* spreadsheet which provides the 'impact inputs' in the calculator. These inputs need to be adjusted each time the composition of any one of the options changes and therefore this spreadsheet forms an integral part of the 'modelling suite'.

Size of impacts

The starting input into this spreadsheet is the qualitative analysis outlined in Appendix Table D.10 and Appendix Table D.15. This analysis provides three key pieces of information:

- Assumed size of impact (low/medium/high) of each measure
- Timescales of impact of each measure
- Which categories of authorisation/certification are impacted by the measure

Using these inputs together with some assumptions we have then turned the qualitative analysis into a) a total impact for each measure and b) a phasing profile to reach total impact.

By default we have categorised low impact measures as having an impact of 2.5%, medium impact measures as having an impact of 10% and high impact measures being user defined reflecting the wide range of impacts from measures included in this category. Low and medium impacts have also been refined as necessary.

All impact percentages reflect reductions in the gap between current authorisation costs/timescales and 'perfect' authorisation costs/timescales as set out in Appendix Table D.6 to Appendix Table D.9. Where appropriate total percentage impacts are differentiated by country type (average/challenging/low resource) and in some instances broken down into different size impacts for different authorisation and certification categories.

Combining measures

Some measures feature overlapping effects with other measures with the result that implementation of the measures together sees a total impact less than the sum of the two measures. To address the issue of overlapping effects we have included, where there is an obvious overlap between measures, adjustment factors capturing the overlap that needs to be removed.

Example inputs

Appendix Figure D.74 to Appendix Figure D.79 on the following pages provide screenshots of total impact inputs for the baseline and all options (A number of columns are hidden to fit the inputs on a single page. In each row we have a measure that forms part of the relevant option. Note that for some measures the impacts have been subdivided into a number of rows to enable the capture of different impacts on different categories of authorisation/certifications and this is

highlighted by yellow shading. Interspersed within the measures are clearly labelled rows which adjust for overlaps between measures.

In the second two columns we have the period of which the impact of each measure is assumed to be phased in. In the three following columns entitled 'Average', 'Low Resource' and 'Challenging', the high/medium/low categorisations in Appendix Table D.10 Appendix Table D.15 have been used to assign percentage impacts by these country types with manual intervention coloured in yellow.

The remaining columns show which authorisation and certification categories are impacted by the impact contained in each row. This is important - a measure might have a large impact but only for a small number of categories meaning that the absolute impact is actually quite small.

Production of inputs for impact assessment calculator

A following worksheet takes the inputs in Appendix Figure D.74 to Appendix Figure D.79 together with the assumed phasing and calculates inputs for the impact assessment calculator in the format required. This includes calculating a total effect (capped at 100%) and an average phasing profile for the relevant option as a whole. The average profile is calculated by weighting individual measure profiles by their associated impact to create a weighted average profile.

Creation of combined option inputs

To create impact inputs for the combined options where the horizontal measures are included in all the other options the process is replicated. To account for overlaps between the horizontal measures and measures already included in options 2 to 5, the impact of the horizontal measures are reduced by the reduction factors found in Table 6.13 in the main report and reproduced in the screen shots below.

APPENDIX FIGURE D.74 SCREENSHOT FROM OPTION IMPACTS SPREADSHEET - BASELINE SCENARIO

Factor	Start	End	Low resource Challenging			New locomotive type authorisation (1st country)	New wagon type authorisation (1st country)	New Multiple Unit type authorisation (1st country)	New Coach type authorisation (1st country)	New locomotive type authorisation (additional country)	New wagon type authorisation (additional country)	New Multiple Unit type authorisation (additional country)	New Coach type authorisation (additional country)	Locomotive type re-authorisation without ERTMS (1st country)	Locomotive type re-authorisation with ERTMS (1st country)	Number of wagon type re-authorisations (1st country)	Multiple Unit type re-authorisation without ERTMS (1st country)	Multiple Unit type re-authorisation with ERTMS (1st country)	Coach type re-authorisation (1st country)	Locomotive type re-authorisation without ERTMS (additional country)	Locomotive type re-authorisation with ERTMS (additional country)	Number of wagon type re-authorisations (additional country)	Multiple Unit type re-authorisation without ERTMS (additional country)	Multiple Unit type re-authorisation with ERTMS (additional country)	Coach type re-authorisation (additional country)	Safety Certification (1st Country) - Freight	Safety Certification (additional Country) - Freight	Safety Certification (1st Country) - Passenger	Safety Certification (additional Country) - Passenger
			Average	Low resource	Challenging																								
DV29 is commonly followed	2011	2014	10.0%	10.0%	2.5%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Entering into force of CR RST and LOC&PAS TSIs	2011	2014	-5.0%	-5.0%	-5.0%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
	2015	2018	5.0%	5.0%	5.0%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Progressive elimination of open points	2011	2020	10.0%	10.0%	10.0%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Improved staffing levels at NSAs	2013	2014	0.0%	5.0%	0.0%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Cross acceptance & tidy up of national rules (locos & Mus)	2011	2018	25.0%	25.0%	15.0%	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0
Cross acceptance & tidy up of national rules (wagons & Coaches)	2011	2018	2.5%	2.5%	2.5%	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
National rules - all first country	2011	2018	15.0%	15.0%	10.0%	1	1	1	1	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
	2014	2017	10.0%	10.0%	10.0%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
TSI scope extension	2017	2025	5.0%	5.0%	5.0%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
	2011	2025	2.5%	2.5%	2.5%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Option package adjustment factor 1 - Cross acceptance effects become less with elimination of open points and TSI scope extension - adj for locos and Mus	2011	2018	-15.0%	-15.0%	-10.0%	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0
Option package adjustment factor 2 - Effect of elimination of open points and TSI scope extension becomes less as national rules are removed - all 1st country	2011	2018	-15.0%	-15.0%	-10.0%	1	1	1	1	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
Option package adjustment factor 3 - Effect of elimination of open points and TSI scope extension becomes less as national rules are removed	2018	2025	-2.5%	-2.5%	-2.5%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Option package adjustment factor 4 - Cross acceptance effects become less with elimination of open points - adj for wagons and Coaches	2011	2018	-2.5%	-2.5%	-2.5%	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0

APPENDIX FIGURE D.75 SCREENSHOT FROM OPTION IMPACTS SPREADSHEET - OPTION 2

Factor	Start	End	Resource			Authorisations																				Safety Certification										
			Average	Low resource	Challenging	New locomotive type authorisation (1st country)	New wagon type authorisation (1st country)	New Multiple Unit type authorisation (1st country)	New Coach type authorisation (1st country)	New locomotive type authorisation (additional country)	New wagon type authorisation (additional country)	New Multiple Unit type authorisation (additional country)	New Coach type authorisation (additional country)	Locomotive type re-authorisation without ERTMS (1st country)	Locomotive type re-authorisation with ERTMS (1st country)	Number of wagon type re-authorisations (1st country)	Multiple Unit type re-authorisation without ERTMS (1st country)	Multiple Unit type re-authorisation with ERTMS (1st country)	Coach type re-authorisation (1st country)	Locomotive type re-authorisation without ERTMS (additional country)	Locomotive type re-authorisation with ERTMS (additional country)	Number of wagon type re-authorisations (additional country)	Multiple Unit type re-authorisation without ERTMS (additional country)	Multiple Unit type re-authorisation with ERTMS (additional country)	Coach type re-authorisation (additional country)	Safety Certification (1st Country) - Freight	Safety Certification (additional Country) - Freight	Safety Certification (1st Country) - Passenger	Safety Certification (additional Country) - Passenger							
2.1.2: Enhanced "coordination" and supervision role of ERA with respect to NSAs regarding granting vehicle of authorisations and safety certificates, including ensuring their mutual recognition by national authorities.	2017	2020	5.0%	5.0%	5.0%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
2.1.B: Enhanced "coordination" and supervision role of ERA with respect to Notified Bodies regarding: type approval; rail vehicles certification; ERTMS certification and accreditation of NoBos.	2017	2020	10.0%	10.0%	10.0%	0	0	0	0	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
	2017	2020	5.0%	5.0%	5.0%	1	1	1	1	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2017	2020	5.0%	5.0%	5.0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
2.1.6: Control by ERA over the functioning of NSAs (for example by developing guidelines and auditing adherence to them).	2017	2022	2.5%	2.5%	2.5%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Mutual recognition of safety certificates (part of 2.1.2)	2017	2025	50.0%	50.0%	50.0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ensuring mutual recognition of vehicle authorisations (part of 2.1.2)	2017	2025	2.5%	2.5%	2.5%	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

APPENDIX FIGURE D.76 SCREENSHOT FROM OPTION IMPACTS SPREADSHEET - OPTION 3

Factor	Start	End	Low resource			New locomotive type authorisation (1st country)	New wagon type authorisation (1st country)	New Multiple Unit type authorisation (1st country)	New Coach type authorisation (1st country)	New locomotive type authorisation (additional country)	New wagon type authorisation (additional country)	New Multiple Unit type authorisation (additional country)	New Coach type authorisation (additional country)	authorisation without ERTMS (1st country)	Locomotive type re-authorisations with ERTMS (1st country)	type re-authorisations (1st country)	authorisation without ERTMS (1st country)	Multiple Unit type re-authorisation with ERTMS (1st country)	Coach type re-authorisation (1st country)	authorisation without ERTMS (additional country)	authorisation with ERTMS (additional country)	type re-authorisations (additional country)	authorisation without ERTMS (additional country)	ERTMS (additional country)	authorisation without ERTMS (additional country)	Coach type re-authorisation (1st Country) - Freight	Safety Certification (additional Country) - Passenger
			Average	Challenging	Challenging																						
2.2.B: ERA shares the competences with the NSAs regarding granting of safety certificates to the railway undertakings and vehicle authorisations placing into service (a "one stop shop" for safety certificates and vehicle authorisation concept): the decision is taken by the NSA, ERA performs "entry and exit" checks of the application and of the decision.	2017	2021	7.5%	7.5%	7.5%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2.1.1a: Migration to a single (common) safety certificate: national authorities issue single safety certificates (mutually recognised by definition)	2018	2025	75.0%	75.0%	75.0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Adjustment for overlap of 2.2.B and Single safety certificate	2017	2021	-5.0%	-5.0%	-5.0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2.3: ERA as an appeal body for some decisions of NSAs	2017	2019	10.0%	10.0%	10.0%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2.1.B: Enhanced "coordination" and supervision role of ERA with respect to NoBos regarding: type approval; rail vehicles certification; ERTMS certification & accreditation of NoBos.	2017	2020	10.0%	10.0%	10.0%	0	0	0	0	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	0	0
	2017	2020	5.0%	5.0%	5.0%	1	1	1	1	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	2017	2020	5.0%	5.0%	5.0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
2.1.6: Control by ERA over the functioning of NSAs (e.g. by developing guidelines & auditing adherence to them).	2017	2022	2.5%	2.5%	2.5%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4.9a: Migration to a single vehicle authorisation (setting up European "passport" for vehicles): national authorities issue single vehicle authorisations (mutually recognised by definition)	2020	2025	5.0%	5.0%	5.0%	0	0	0	0	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	0	0
Option package adjustment factor 1 - Impact of 2.3 reduces as open points are closed and national rules are removed	2017	2020	-7.5%	-7.5%	-7.5%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

APPENDIX FIGURE D.77 SCREENSHOT FROM OPTION IMPACTS SPREADSHEET - OPTION 4

Factor	Start	End	Low resource			New locomotive type authorisation (1st country)	New wagon type authorisation (1st country)	New Multiple Unit type authorisation (1st country)	New Coach type authorisation (1st country)	New locomotive type authorisation (additional country)	New wagon type authorisation (additional country)	New Multiple Unit type authorisation (additional country)	New Coach type authorisation (additional country)	Locomotive type re-authorisation without ERTMS (1st country)	Locomotive type re-authorisation with ERTMS (1st country)	Number of wagon type re-authorisations (1st country)	Multiple Unit type re-authorisation without ERTMS (1st country)	Multiple Unit type re-authorisation with ERTMS (1st country)	Coach type re-authorisation (1st country)	Locomotive type re-authorisation with ERTMS (additional country)	Locomotive type re-authorisation without ERTMS (additional country)	Number of wagon type re-authorisations (additional country)	Multiple Unit type re-authorisation without ERTMS (additional country)	Multiple Unit type re-authorisation with ERTMS (additional country)	Coach type re-authorisation (additional country)	Safety Certification (1st Country) - Freight	Safety Certification (additional Country) - Freight	Safety Certification (1st Country) - Passenger	Safety Certification (additional Country) - Passenger
			Average	Challenging	Challenging																								
2.2.Z: ERA shares the competences with the NSAs regarding granting of safety certificates to RUs & vehicle authorisations to applicants: a "one stop shop" concept with the NSAs (acting as regional offices of ERA) contributing in the process but the final decision rests with ERA.	2017	2023	40.0%	40.0%	40.0%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2.1.1b: Migration to a single (common) safety certificate: ERA issues single safety certificates	2018	2023	85.0%	85.0%	85.0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
2.1.B: Enhanced "coordination" and supervision role of ERA with respect to NoBos regarding: type approval; rail vehicles certification; ERTMS certification and accreditation of NoBos.	2017	2020	12.5%	12.5%	12.5%	0	0	0	0	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0
	2017	2020	7.5%	7.5%	7.5%	1	1	1	1	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
	2017	2020	5.0%	5.0%	5.0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
Option package adjustment factor 1 - Removal of substitutionary effect of 2.2.Z and 2.1.1	2017	2023	-30.0%	-30.0%	-30.0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
4.9b: Migration to a single vehicle authorisation (setting up European "passport" for vehicles): ERA issues single vehicle authorisations	2020	2025	10.0%	10.0%	10.0%	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0

APPENDIX FIGURE D.79 SCREENSHOT FROM OPTION IMPACTS SPREADSHEET - OPTION 6

Factor	Start	End	Average			New locomotive type authorisation (1st country)	New wagon type authorisation (1st country)	New Multiple Unit type authorisation (1st country)	New Coach type authorisation (1st country)	New locomotive type authorisation (additional country)	New wagon type authorisation (additional country)	New Multiple Unit type authorisation (additional country)	New Coach type authorisation (additional country)	Locomotive type re-authorisation without ERTMS (1st country)	Locomotive type re-authorisation with ERTMS (1st country)	Number of wagon type re-authorisations (1st country)	Multiple Unit type re-authorisation without ERTMS (1st country)	Multiple Unit type re-authorisation with ERTMS (1st country)	Coach type re-authorisation (1st country)	Locomotive type re-authorisation without ERTMS (additional country)	Locomotive type re-authorisation with ERTMS (additional country)	Number of wagon type re-authorisations (additional country)	Multiple Unit type re-authorisation without ERTMS (additional country)	Multiple Unit type re-authorisation with ERTMS (additional country)	Coach type re-authorisation (additional country)	Safety Certification (1st Country) - Freight	Safety Certification (1st Country) - Passenger	Safety Certification (additional Country) - Freight	Safety Certification (additional Country) - Passenger
			Low resource	Challenging	Challenging																								
3.1: Strengthened action by the Commission in implementing the legislation	2015	2018	10.0%	20.0%	10.0%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3.3: Amendment of the railway directives to enable the adoption by the Commission of implementing measures setting out common principles & practices for the national authorities	2017	2022	10.0%	10.0%	15.0%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4.1.1: Enhanced role of ERA in monitoring & control of implementation of national safety & interoperability legislation	2016	2018	2.5%	2.5%	2.5%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4.1.2: Migrating from national technical & safety rules to EU rules through clear indication of what national rules need to be removed by national authorities with the national authorities tasked with the role of removing them. Also modify the directive with a view to limit/remove the possibility for MS to adopt new	2015	2020	5.0%	5.0%	10.0%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
	2017	2020	-5.0%	-5.0%	-10.0%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
4.2: Enhanced role of ERA in dissemination of railway-related information and training.	2015	2020	5.0%	5.0%	10.0%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
	2015	2017	0.0%	0.0%	0.0%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4.3: Enhanced role of ERA in providing advice and support for Member States and other stakeholders in implementing EU legislation on safety & interoperability	2015	2018	5.0%	5.0%	5.0%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4.6: Communication from the Commission regarding guidelines on the interpretation of specific EU laws & decisions (including TSIs)	2016	2018	5.0%	5.0%	10.0%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4.6 & 3.3 Duplication	2017	2022	-5.0%	-5.0%	-10.0%	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Administrative cost model

Introduction

The administrative costs have been analysed using a methodology that has been built out of the standard cost approach set out in the Impact Assessment guidelines. The approach used differs from the standard cost model as all administrative costs have been computed, not only those that could be accounted for as additional “burdens”. We believe that this approach is correct for the purpose of this study because the policy options have a significant impact on administrative costs of EU and national institutions and, as such, needs to be investigated in detail.

This analysis has been carried out on the basis that some of the proposed measures entail a variation in the staff needed by ERA to perform additional tasks, and, in some cases, possible reductions of staff at NSAs as some competences will need to be transferred to a central body (the Agency).

The aim of this analysis is to assess the difference in administrative costs determined by the implementation of the selected policy options against a baseline scenario in which none of the measures are adopted. Although we acknowledge that in the actual baseline scenario there could be administrative cost variations over time (e.g. due by NSA or ERA staff growth for better implementation of current rules), in this analysis we have focussed on the difference in costs between adopting the policy options or doing nothing.

We have also assessed the impact on fees for vehicle authorisation and safety certification. For this analysis we have assumed that there will be a standardisation of fees at EU level for all of the incremental options (Options 2 to 5). We discuss this in more detail below.

For each Policy Option, we have sought to disaggregate impacts in order to identify variations in costs on each specific stakeholder groupings, i.e.:

- The Agency (and the Commission particularly in relation to the Horizontal Measures); and
- National institutions (in particular NSAs).

For the purpose of the analysis, all costs are indexed to a base year of 2012 and are computed in real terms over the period 2012-2025 using as indicator the Net Present Value with a 4% discount rate, which is consistent with the assumption made for the IA calculator presented above.

For the different options we have estimated the net administrative cost by computing:

- The variation in gross administrative costs at Community level (namely variation in ERA costs, in the “separate appeal body” to be created in Options 4 and 5 and in the Commission staff), at national level (variation in NSAs costs) and at the EU level (sum of variation in ERA and NSAs costs); and
- The variation of potential revenues collected by levying charges for the activities carried on by the NSAs and ERA in relation to the release of safety certificates and vehicle authorisation.

Calcs; Inputs

The following inputs have been used for the estimation of the administrative costs:

I Agency costs:

- Variation of number of staff in the different options: estimated on the basis of our assessment of the individual measures included in each option. In addition, we have phased in the estimated total variation in staff members to take into account the fact that the recruitment process needs a number of years to be finalised (we have in any case estimated that by 2020 the situation will have stabilised).
- Gross cost of Agency staff members: estimated on the basis of the average staff cost indicated by the Agency, i.e. €100k. This value was converted into a range of costs varying with staff number increase as we expect a lower average cost of staff where larger numbers of staff are required as more junior staff will be required when numbers increase.
- Overhead costs: computed at 25% of staff costs.
- Other costs: values estimated on a case by case basis looking at individual measures. These costs include, for example, travelling costs to attend conferences, outsourcing costs for evaluation studies/technical support and such additional costs as the administrative costs of setting up the internal processes for receiving revenue.

The work already undertaken to date by the Agency in relation to its future role has informed this assessment but the approach we have used to these calculations differs from those used by the Agency as we have identified synergies that can be exploited through the implementation of different measures within a single “option” package.

I NSAs costs:

- Variation of number of staff in the different options: for each option we first estimated an average variation in NSAs staff members in the EU, taking into account of the current structure of NSAs in the EU, which have different size and tasks. We then computed aggregate variations in EU 12 and EU 15 MS, taking into account that only 25 out of the 27 MS currently have railway infrastructure and related institutions. In addition, as done for the Agency, we have distributed across years the estimated total variation in staff members assuming in any case that by 2020 all staff member variation have occurred.
- Gross cost of NSA staff members: estimated on the basis of the average staff cost resulting for EU 12 and EU 15 MS from the case studies undertaken. We also assumed no growth rate for EU 15 MS salaries over the period of analysis, while we used a 7% yearly growth rate for EU 12 salaries to close the existing gap with EU 15 ones.
- Overhead costs: computed at 25% of staff costs as for the Agency.
- Other costs: no cost added as we considered they are not relevant for NSAs.

I Safety certificate and vehicle authorisation revenues and total cost coverage:

- Number of safety certificates: we used the numbers of forecasted safety certificates issued yearly in the EU in the 2015-2025 period as in the IA

calculator discussed above. Data have been disaggregated by EU 12 and EU 15 MS.

- Safety certificate fees: average current fees have been estimated on the basis of the data collected during the stakeholder consultation (a fee of €20k for EU 15 MS and €3k for EU 12 MS). Future fees have been set equal to € 10k across all the EU to take into account of a standardisation of payments and procedures. We have maintained the IA calculator assumption that safety certification numbers remain unchanged in future.
- Vehicle authorisation fees: average current fees have been estimated on the basis of information gathered during the stakeholder consultation which informed us of the overall cost of authorisation. We have assumed that this is made up of a number of components as set out below Table 6.1 in the main report. Using data on Agency fee rates and average authorisation timescales in the IA calculator we have derived a current average fee per type authorisation (across all types of authorisations) - €28k for EU 15 MS and €11 k for EU 12 MS - and a future fee for these authorisations of €17k standard across Europe which reflects the shorter authorisation timescales in the options. We have maintained the IA calculator assumption that over time the total number of authorisations will decrease by a CAGR of 0.5% per annum in the EU 12 Member States and 1.6% in the EU 15 Member States.
- Revenue sharing: different criteria for sharing revenues between the Agency and NSAs have been identified for the different options on the basis of the different contribution given by these institutions to this process. In the case of options 2 and 3 revenues have been entirely assigned to NSAs (as in the current situation); in the case of option 4, different scenarios have been used to test the impacts of the consequences of changing the distribution of revenues between ERA and NSAs, i.e.: option 4.a where ERA keeps 75% of revenues and NSAs 25%, option 4.b where revenues are equally split between ERA and the NSAs and option 4.c where ERA collects 25% of revenues and NSAs 75%.

APPENDIX FIGURE D.80 SCREENSHOT FROM ADMIN COSTS INPUTS

Admin Cost Assumptions

Staff costs

ERA	Average annual gross cost of ERA staff (€)	Base year
from 1 to 10	100,000	2012
from 11 to 50	90,000	2012
from 51 to 150	80,000	2012
over 150	70,000	2012

NSA	Average annual gross cost of NSAs staff (€)	Base year	Annual growth rate of EU12 salaries (real terms)
EU 12	21,885	2012	7%
EU 15	87,237	2012	0%

Note: estimated on the basis of specific information collected from case studies

Total Variation of Staff

	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
ERA		20	25	35	300	25
NSA (single)			-2	-3	-10	-2

Overhead costs

	% of direct staff costs
ERA	25%
NSA	25%

Other costs

	Assumption
ERA	Values for the different options computed on the basis of ERA evaluation study. They represent additional costs for travelling,
NSA	Not applicable

Number of NSAs

	Number
EU 12	10
EU 15	15

Effects of combined options

Option 2&6	Option 3&6	Option 4&6	Option 5&6
0.95	0.9	0.65	0.4

Fees paid for safety certificates

	Current (€)	Future (€)	Base year
EU 12	3,000	10,000	2012
EU 15	20,000	10,000	2012

Number of safety certificates issued per year

	Current	Future	Base year	CAGR of issued certificates
EU 12 Freight	42	42	2012	
Passenger	15	15		
Total	56	56		0%
EU 15 Freight	20	20	2012	
Passenger	34	34		
Total	54	54		0%

Fees paid for Authorisations

	Current (€)	Future (€)	Base year
EU 12	11,000	17,000	2012
EU 15	28,000	17,000	2012

Number of authorisations issued per year

	Current	Future	Base year	CAGR of issued authorisations
EU 12 Freight	0	0	2012	
Passenger	0	0		
Total	162	152		-0.5%
EU 15 Freight	0	0	2012	
Passenger	0	0		
Total	361	295		-1.6%

Revenue sharing ERA-NSAs

	ERA	NSA
Option 2&6	0	100%
Option 3&6	0	100%
Option 4&6		
a.	75%	25%
b.	50%	50%
c.	25%	75%
Option 5&6	100%	0

Revenue sharing ERA-NSAs

	ERA	NSA
Option 2&6	0	100%
Option 3&6	0	100%
Option 4&6		
a.	75%	25%
b.	50%	50%
c.	25%	75%
Option 5&6	100%	0

ERA budget

	2009 (€ mil)
Current ERA budget	€ 20

ERA budget

	2009 (€ mil)
Current ERA budget	€ 20

Calcs; Outputs

On the basis of the inputs discussed above we computed for the different policy options:

- The cost impact of single and merged measures on both the Agency and the NSAs.
- The variation of potential revenues from safety certificates and authorisation, looking also at different possible distribution criteria between NSAs and the Agency
- The share of Agency cost recovery of activities related to safety certificates.

Given that cost reductions for RUs in the IA calculator include benefits from lower authorisation fees arising from faster authorisation, this sheet also removes authorisation fee benefits from standardisation of authorisation fees to avoid overstating benefits. The calculation of this element is shown in Appendix Figure D.83 below and the final value per option is shown in the “ERA/NSA authorisation fees loss” column in Appendix Figure D.84.

To illustrate the functioning of the model, the following figures report a screenshot of:

- cost impacts computed on merged options
- revenue impacts for options 4 and 5
- net admin cost variation.

APPENDIX FIGURE D.81 SCREENSHOT FROM ADMIN COSTS OUTPUTS: COST VARIATION OF MERGED OPTIONS

NPV (€ mil)		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Impacts on ERA												
Option 1 & 6	Staff decrease (increase)		4	6	8	14	18	25	25	25	25	25
	Direct staff cost decrease (increase)		360,000	540,000	720,000	1,360,000	1,720,000	2,350,000	2,350,000	2,350,000	2,350,000	2,350,000
	Overhead		100,000	150,000	200,000	340,000	430,000	587,500	587,500	587,500	587,500	587,500
	Other costs		899,998	899,999	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000
	Total cost decrease (increase)		1,399,998	1,649,999	1,900,000	2,600,000	3,050,000	3,837,500	3,837,500	3,837,500	3,837,500	3,837,500
	NPV (2012 base year)	25.82										
Option 2 & 6	Staff decrease (increase)		12	14	16	20	24	28	28	28	28	28
	Direct staff cost decrease (increase)		1,180,000	1,360,000	1,540,000	1,900,000	2,260,000	2,620,000	2,620,000	2,620,000	2,620,000	2,620,000
	Overhead		295,000	340,000	385,000	475,000	565,000	655,000	655,000	655,000	655,000	655,000
	Other costs		499,998	499,999	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000
	Total cost decrease (increase)		1,974,998	2,199,999	2,425,000	2,875,000	3,325,000	3,775,000	3,775,000	3,775,000	3,775,000	3,775,000
	NPV (2012 base year)	27.54										
Option 3 & 6	Staff decrease (increase)		11	13	15	21	25	32	32	32	32	32
	Direct staff cost decrease (increase)		1,090,000	1,270,000	1,450,000	1,990,000	2,350,000	2,980,000	2,980,000	2,980,000	2,980,000	2,980,000
	Overhead		272,500	317,500	362,500	497,500	587,500	745,000	745,000	745,000	745,000	745,000
	Other costs		499,998	499,999	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000
	Total cost decrease (increase)		1,862,498	2,087,499	2,312,500	2,987,500	3,437,500	4,225,000	4,225,000	4,225,000	4,225,000	4,225,000
	NPV (2012 base year)	29.36										
Option 4 & 6	Staff decrease (increase)		13	19	22	27	32	42	42	42	42	42
	Direct staff cost decrease (increase)		1,270,000	1,810,000	2,080,000	2,530,000	2,980,000	3,880,000	3,880,000	3,880,000	3,880,000	3,880,000
	Overhead		317,500	452,500	520,000	632,500	745,000	970,000	970,000	970,000	970,000	970,000
	Other costs		299,998	299,999	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000
	Total cost decrease (increase)		1,887,498	2,562,499	2,900,000	3,462,500	4,025,000	5,150,000	5,150,000	5,150,000	5,150,000	5,150,000
	NPV (2012 base year)	35.22										
Option 5 & 6	Staff decrease (increase)		52	102	152	302	302	302	302	302	302	302
	Direct staff cost decrease (increase)		4,760,000	8,760,000	12,760,000	23,240,000	23,240,000	23,240,000	23,240,000	23,240,000	23,240,000	23,240,000
	Overhead		1,190,000	2,190,000	3,190,000	5,810,000	5,810,000	5,810,000	5,810,000	5,810,000	5,810,000	5,810,000
	Other costs		2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000
	Total cost decrease (increase)		7,950,000	12,950,000	17,950,000	31,050,000	31,050,000	31,050,000	31,050,000	31,050,000	31,050,000	31,050,000
	NPV (2012 base year)	221.42										

Impacts on NSAs			2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Option 1 & 6	EU 12	Staff decrease (increase) per NSA	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	
		Direct staff cost decrease (increase) per NSA	53,620	57,373	61,389	65,686	70,285	75,204	80,469	86,102	92,129	98,578	105,478	
		Overhead per NSA	13,405	14,343	15,347	16,422	17,571	18,801	20,117	21,525	23,032	24,644	26,370	
	EU 12	Total cost decrease (increase) per NSA	67,025	71,716	76,737	82,108	87,856	94,006	100,586	107,627	115,161	123,222	131,848	
		Total cost decrease (increase) in EU 12	670,246	717,164	767,365	821,081	878,556	940,055	1,005,859	1,076,269	1,151,608	1,232,221	1,318,476	
		Staff decrease (increase)	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
	EU 15	Direct staff cost decrease (increase)	174,473	174,473	174,473	174,473	174,473	174,473	174,473	174,473	174,473	174,473	174,473	174,473
		Overhead	43,618	43,618	43,618	43,618	43,618	43,618	43,618	43,618	43,618	43,618	43,618	43,618
		Total cost decrease (increase)	218,092	218,092	218,092	218,092	218,092	218,092	218,092	218,092	218,092	218,092	218,092	218,092
	EU 15	Total cost decrease (increase) in EU 15	3,271,378	3,271,378	3,271,378	3,271,378	3,271,378	3,271,378	3,271,378	3,271,378	3,271,378	3,271,378	3,271,378	3,271,378
NPV (2012 base year)		-36.86												
Option 2 & 6	EU 12	Staff decrease (increase) per NSA	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	
		Direct staff cost decrease (increase) per NSA	53,620	57,373	61,389	65,686	70,285	75,204	80,469	86,102	92,129	98,578	105,478	
		Overhead per NSA	13,405	14,343	15,347	16,422	17,571	18,801	20,117	21,525	23,032	24,644	26,370	
	EU 12	Total cost decrease (increase) per NSA	67,025	71,716	76,737	82,108	87,856	94,006	100,586	107,627	115,161	123,222	131,848	
		Total cost decrease (increase) in EU 12	670,246	717,164	767,365	821,081	878,556	940,055	1,005,859	1,076,269	1,151,608	1,232,221	1,318,476	
		Staff decrease (increase)	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
	EU 15	Direct staff cost decrease (increase)	174,473	174,473	174,473	174,473	174,473	174,473	174,473	174,473	174,473	174,473	174,473	174,473
		Overhead	43,618	43,618	43,618	43,618	43,618	43,618	43,618	43,618	43,618	43,618	43,618	43,618
		Total cost decrease (increase)	218,092	218,092	218,092	218,092	218,092	218,092	218,092	218,092	218,092	218,092	218,092	218,092
	EU 15	Total cost decrease (increase) in EU 15	3,271,378	3,271,378	3,271,378	3,271,378	3,271,378	3,271,378	3,271,378	3,271,378	3,271,378	3,271,378	3,271,378	3,271,378
NPV (2012 base year)		-36.86												
Option 3 & 6	EU 12	Staff decrease (increase) per NSA	-2	-2	-3	-3	-3	-4	-4	-4	-4	-4	-4	
		Direct staff cost decrease (increase) per NSA	43,770	43,770	65,654	65,654	65,654	87,539	87,539	87,539	87,539	87,539	87,539	
		Overhead per NSA	10,942	10,942	16,414	16,414	16,414	21,885	21,885	21,885	21,885	21,885	21,885	
	EU 12	Total cost decrease (increase) per NSA	54,712	54,712	82,068	82,068	82,068	109,424	109,424	109,424	109,424	109,424	109,424	
		Total cost decrease (increase) in EU 12	547,121	547,121	820,681	820,681	820,681	1,094,241	1,094,241	1,094,241	1,094,241	1,094,241	1,094,241	
		Staff decrease (increase)	-2	-2	-3	-3	-3	-4	-4	-4	-4	-4	-4	
	EU 15	Direct staff cost decrease (increase)	174,473	174,473	261,710	261,710	261,710	348,947	348,947	348,947	348,947	348,947	348,947	
		Overhead	43,618	43,618	65,428	65,428	65,428	87,237	87,237	87,237	87,237	87,237	87,237	
		Total cost decrease (increase)	218,092	218,092	327,138	327,138	327,138	436,184	436,184	436,184	436,184	436,184	436,184	
	EU 15	Total cost decrease (increase) in EU 15	3,271,378	3,271,378	4,907,067	4,907,067	4,907,067	6,542,756	6,542,756	6,542,756	6,542,756	6,542,756	6,542,756	
NPV (2012 base year)		-54.80												
Option 4 & 6	EU 12	Staff decrease (increase) per NSA	-2	-2	-4	-4	-4	-5	-5	-5	-5	-5	-5	
		Direct staff cost decrease (increase) per NSA	43,770	43,770	87,539	87,539	87,539	109,424	109,424	109,424	109,424	109,424	109,424	
		Overhead per NSA	10,942	10,942	21,885	21,885	21,885	27,356	27,356	27,356	27,356	27,356	27,356	
	EU 12	Total cost decrease (increase) per NSA	54,712	54,712	109,424	109,424	109,424	136,780	136,780	136,780	136,780	136,780	136,780	
		Total cost decrease (increase) in EU 12	547,121	547,121	1,094,241	1,094,241	1,094,241	1,367,802	1,367,802	1,367,802	1,367,802	1,367,802	1,367,802	
		Staff decrease (increase)	-2	-2	-4	-4	-4	-5	-5	-5	-5	-5	-5	
	EU 15	Direct staff cost decrease (increase)	174,473	174,473	348,947	348,947	348,947	436,184	436,184	436,184	436,184	436,184	436,184	
		Overhead	43,618	43,618	87,237	87,237	87,237	109,046	109,046	109,046	109,046	109,046	109,046	
		Total cost decrease (increase)	218,092	218,092	436,184	436,184	436,184	545,230	545,230	545,230	545,230	545,230	545,230	
	EU 15	Total cost decrease (increase) in EU 15	3,271,378	3,271,378	6,542,756	6,542,756	6,542,756	8,178,445	8,178,445	8,178,445	8,178,445	8,178,445	8,178,445	
NPV (2012 base year)		-67.93												
Option 5 & 6	EU 12	Staff decrease (increase) per NSA	-4	-6	-8	-9	-10	-11	-11	-11	-11	-11	-11	
		Direct staff cost decrease (increase) per NSA	-87539.31796	-131308.9769	-175078.6359	-196963.4654	-218848.2949	-240733.1244	-240733.1244	-240733.1244	-240733.1244	-240733.1244	-240733.1244	
		Overhead per NSA	-21884.82949	-32827.24423	-43769.65898	-49240.86635	-54712.07372	-60183.28109	-60183.28109	-60183.28109	-60183.28109	-60183.28109	-60183.28109	
	EU 12	Total cost decrease (increase) per NSA	-109424.1474	-164136.2212	-218848.2949	-246204.3318	-273560.3686	-300916.4055	-300916.4055	-300916.4055	-300916.4055	-300916.4055	-300916.4055	
		Total cost decrease (increase) in EU 12	-1094241.474	-1641362.212	-2188482.949	-2462043.318	-2735603.686	-3009164.055	-3009164.055	-3009164.055	-3009164.055	-3009164.055	-3009164.055	
		Staff decrease (increase)	-4	-6	-8	-9	-10	-11	-11	-11	-11	-11	-11	
	EU 15	Direct staff cost decrease (increase)	-348946.993	-523420.4895	-697893.9861	-785130.7343	-872367.4826	-959604.2308	-959604.2308	-959604.2308	-959604.2308	-959604.2308	-959604.2308	
		Overhead	-87236.74826	-130855.1224	-174473.4965	-196282.6836	-218091.8706	-239901.0577	-239901.0577	-239901.0577	-239901.0577	-239901.0577	-239901.0577	
		Total cost decrease (increase)	-436183.7413	-654275.6119	-872367.4826	-981413.4179	-1090459.353	-1199505.289	-1199505.289	-1199505.289	-1199505.289	-1199505.289	-1199505.289	
	EU 15	Total cost decrease (increase) in EU 15	-6542756.119	-9814134.179	-13085512.24	-14721201.27	-16356890.3	-17992579.33	-17992579.33	-17992579.33	-17992579.33	-17992579.33	-17992579.33	
NPV (2012 base year)		-152.38												

Total Impacts		Net cost (benefit)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Option 1 & 6	Total cost decrease (increase)												
	NPV (2012 base year)	25.82	2,541,626 -	2,338,543 -	2,138,743 -	1,492,459 -	1,099,934 -	373,933 -	439,737 -	510,147 -	585,486 -	666,099 -	752,354
Option 2 & 6	Total cost decrease (increase)												
	NPV (2012 base year)	-9.32	1,966,626 -	1,788,543 -	1,613,743 -	1,217,459 -	824,934 -	436,433 -	502,237 -	572,647 -	647,986 -	728,599 -	814,854
Option 3 & 6	Total cost decrease (increase)												
	NPV (2012 base year)	-25.44	1,956,001 -	1,731,000 -	3,415,248 -	2,740,248 -	2,290,248 -	3,411,998 -	3,411,998 -	3,411,998 -	3,411,998 -	3,411,998 -	3,411,998
Option 4 & 6	Total cost decrease (increase)												
	NPV (2012 base year)	-32.71	1,931,001 -	1,256,000 -	4,736,998 -	4,174,498 -	3,611,998 -	4,396,247 -	4,396,247 -	4,396,247 -	4,396,247 -	4,396,247 -	4,396,247
Option 5 & 6	Total cost decrease (increase)												
	NPV (2012 base year)	69.04	313,002	1,494,504	2,676,005	13,866,755	11,957,506	10,048,257	10,048,257	10,048,257	10,048,257	10,048,257	10,048,257

APPENDIX FIGURE D.82 SCREENSHOT FROM ADMIN COSTS OUTPUTS: FEE REVENUE VARIATION ANALYSIS - TOTAL

Variation in revenues		Net cost (ber)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Option 4 & 6													
a.													
ERA	Current revenues												
	Future Revenues		6,484,578	6,474,983	6,465,436	6,455,938	6,446,487	6,437,083	6,427,728	6,418,419	6,409,157	6,399,942	6,390,774
	Variation		6,484,578	6,474,983	6,465,436	6,455,938	6,446,487	6,437,083	6,427,728	6,418,419	6,409,157	6,399,942	6,390,774
	NPV	56.43											
NSAs	Current revenues		12,648,460	12,489,388	12,332,700	12,178,359	12,026,328	11,876,572	11,729,057	11,583,747	11,440,609	11,299,609	11,160,715
	Future Revenues		2,161,526	2,158,328	2,155,145	2,151,979	2,148,829	2,145,694	2,142,576	2,139,473	2,136,386	2,133,314	2,130,258
	Variation	-	10,486,934 -	10,331,061 -	10,177,555 -	10,026,380 -	9,877,499 -	9,730,878 -	9,586,481 -	9,444,274 -	9,304,223 -	9,166,295 -	9,030,457
	NPV	-85.84											
TOTAL	Variation	-	4,002,355 -	3,856,078 -	3,712,119 -	3,570,442 -	3,431,012 -	3,293,794 -	3,158,753 -	3,025,855 -	2,895,066 -	2,766,353 -	2,639,684
	NPV (2012 base year)	-29.42											
b.													
ERA	Current revenues												
	Future Revenues		4,323,052	4,316,655	4,310,291	4,303,958	4,297,658	4,291,389	4,285,152	4,278,946	4,272,772	4,266,628	4,260,516
	Variation		4,323,052	4,316,655	4,310,291	4,303,958	4,297,658	4,291,389	4,285,152	4,278,946	4,272,772	4,266,628	4,260,516
	NPV	37.62											
NSAs	Current revenues		12,648,460	12,489,388	12,332,700	12,178,359	12,026,328	11,876,572	11,729,057	11,583,747	11,440,609	11,299,609	11,160,715
	Future Revenues		4,323,052	4,316,655	4,310,291	4,303,958	4,297,658	4,291,389	4,285,152	4,278,946	4,272,772	4,266,628	4,260,516
	Variation	-	8,325,408 -	8,172,733 -	8,022,409 -	7,874,400 -	7,728,670 -	7,585,183 -	7,443,905 -	7,304,801 -	7,167,837 -	7,032,981 -	6,900,199
	NPV	-67.04											
TOTAL	Variation	-	4,002,355 -	3,856,078 -	3,712,119 -	3,570,442 -	3,431,012 -	3,293,794 -	3,158,753 -	3,025,855 -	2,895,066 -	2,766,353 -	2,639,684
	NPV (2012 base year)	-29.42											
c.													
ERA	Current revenues												
	Future Revenues		2,161,526	2,158,328	2,155,145	2,151,979	2,148,829	2,145,694	2,142,576	2,139,473	2,136,386	2,133,314	2,130,258
	Variation		2,161,526	2,158,328	2,155,145	2,151,979	2,148,829	2,145,694	2,142,576	2,139,473	2,136,386	2,133,314	2,130,258
	NPV	18.81											
NSAs	Current revenues		12,648,460	12,489,388	12,332,700	12,178,359	12,026,328	11,876,572	11,729,057	11,583,747	11,440,609	11,299,609	11,160,715
	Future Revenues		6,484,578	6,474,983	6,465,436	6,455,938	6,446,487	6,437,083	6,427,728	6,418,419	6,409,157	6,399,942	6,390,774
	Variation	-	6,163,881 -	6,014,405 -	5,867,264 -	5,722,421 -	5,579,841 -	5,439,489 -	5,301,329 -	5,165,328 -	5,031,451 -	4,899,667 -	4,769,942
	NPV	-48.23											
TOTAL	Variation	-	4,002,355 -	3,856,078 -	3,712,119 -	3,570,442 -	3,431,012 -	3,293,794 -	3,158,753 -	3,025,855 -	2,895,066 -	2,766,353 -	2,639,684
	NPV (2012 base year)	-29.42											
Option 5 & 6													
ERA	Current revenues												
	Future Revenues		8,646,105	8,633,311	8,620,582	8,607,917	8,595,316	8,582,778	8,570,304	8,557,892	8,545,543	8,533,256	8,521,032
	Variation		8,646,105	8,633,311	8,620,582	8,607,917	8,595,316	8,582,778	8,570,304	8,557,892	8,545,543	8,533,256	8,521,032
	NPV	75.23											
NSAs	Current revenues		12,648,460	12,489,388	12,332,700	12,178,359	12,026,328	11,876,572	11,729,057	11,583,747	11,440,609	11,299,609	11,160,715
	Future Revenues												
	Variation	-	12,648,460 -	12,489,388 -	12,332,700 -	12,178,359 -	12,026,328 -	11,876,572 -	11,729,057 -	11,583,747 -	11,440,609 -	11,299,609 -	11,160,715
	NPV	-104.65											
TOTAL	Variation	-	4,002,355 -	3,856,078 -	3,712,119 -	3,570,442 -	3,431,012 -	3,293,794 -	3,158,753 -	3,025,855 -	2,895,066 -	2,766,353 -	2,639,684
	NPV (2012 base year)	-29.42											

APPENDIX FIGURE D.83 SCREENSHOT FROM ADMIN COSTS OUTPUTS: FEE REVENUE VARIATION ANALYSIS - AUTHORISATION FEES ELEMENT

Variation in revenues		Net cost (ber)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Option 4 & 6													
a.													
ERA	Current revenues												
	Future Revenues		5,659,578	5,649,983	5,640,436	5,630,938	5,621,487	5,612,083	5,602,728	5,593,419	5,584,157	5,574,942	5,565,774
	Variation		5,659,578	5,649,983	5,640,436	5,630,938	5,621,487	5,612,083	5,602,728	5,593,419	5,584,157	5,574,942	5,565,774
	NPV	49.20											
NSAs	Current revenues		11,403,860	11,244,788	11,088,100	10,933,759	10,781,728	10,631,972	10,484,457	10,339,147	10,196,009	10,055,009	9,916,115
	Future Revenues		1,886,526	1,883,328	1,880,145	1,876,979	1,873,829	1,870,694	1,867,576	1,864,473	1,861,386	1,858,314	1,855,258
	Variation		9,517,334 -	9,361,461 -	9,207,955 -	9,056,780 -	8,907,899 -	8,761,278 -	8,616,881 -	8,474,674 -	8,334,623 -	8,196,695 -	8,060,857
	NPV	-77.35											
TOTAL	Variation		3,857,755 -	3,711,478 -	3,567,519 -	3,425,842 -	3,286,412 -	3,149,194 -	3,014,153 -	2,881,255 -	2,750,466 -	2,621,753 -	2,495,084
	NPV (2012 base year)	-28.15											
b.													
ERA	Current revenues												
	Future Revenues		3,773,052	3,766,655	3,760,291	3,753,958	3,747,658	3,741,389	3,735,152	3,728,946	3,722,772	3,716,628	3,710,516
	Variation		3,773,052	3,766,655	3,760,291	3,753,958	3,747,658	3,741,389	3,735,152	3,728,946	3,722,772	3,716,628	3,710,516
	NPV	32.80											
NSAs	Current revenues		11,403,860	11,244,788	11,088,100	10,933,759	10,781,728	10,631,972	10,484,457	10,339,147	10,196,009	10,055,009	9,916,115
	Future Revenues		3,773,052	3,766,655	3,760,291	3,753,958	3,747,658	3,741,389	3,735,152	3,728,946	3,722,772	3,716,628	3,710,516
	Variation		7,630,808 -	7,478,133 -	7,327,809 -	7,179,800 -	7,034,070 -	6,890,583 -	6,749,305 -	6,610,201 -	6,473,237 -	6,338,381 -	6,205,599
	NPV	-60.95											
TOTAL	Variation		3,857,755 -	3,711,478 -	3,567,519 -	3,425,842 -	3,286,412 -	3,149,194 -	3,014,153 -	2,881,255 -	2,750,466 -	2,621,753 -	2,495,084
	NPV (2012 base year)	-28.15											
c.													
ERA	Current revenues												
	Future Revenues		1,886,526	1,883,328	1,880,145	1,876,979	1,873,829	1,870,694	1,867,576	1,864,473	1,861,386	1,858,314	1,855,258
	Variation		1,886,526	1,883,328	1,880,145	1,876,979	1,873,829	1,870,694	1,867,576	1,864,473	1,861,386	1,858,314	1,855,258
	NPV	16.40											
NSAs	Current revenues		11,403,860	11,244,788	11,088,100	10,933,759	10,781,728	10,631,972	10,484,457	10,339,147	10,196,009	10,055,009	9,916,115
	Future Revenues		5,659,578	5,649,983	5,640,436	5,630,938	5,621,487	5,612,083	5,602,728	5,593,419	5,584,157	5,574,942	5,565,774
	Variation		5,744,281 -	5,594,805 -	5,447,664 -	5,302,821 -	5,160,241 -	5,019,889 -	4,881,729 -	4,745,728 -	4,611,851 -	4,480,067 -	4,350,342
	NPV	-44.55											
TOTAL	Variation		3,857,755 -	3,711,478 -	3,567,519 -	3,425,842 -	3,286,412 -	3,149,194 -	3,014,153 -	2,881,255 -	2,750,466 -	2,621,753 -	2,495,084
	NPV (2012 base year)	-28.15											
Option 5 & 6													
ERA	Current revenues												
	Future Revenues		7,546,105	7,533,311	7,520,582	7,507,917	7,495,316	7,482,778	7,470,304	7,457,892	7,445,543	7,433,256	7,421,032
	Variation		7,546,105	7,533,311	7,520,582	7,507,917	7,495,316	7,482,778	7,470,304	7,457,892	7,445,543	7,433,256	7,421,032
	NPV	65.60											
NSAs	Current revenues		11,403,860	11,244,788	11,088,100	10,933,759	10,781,728	10,631,972	10,484,457	10,339,147	10,196,009	10,055,009	9,916,115
	Future Revenues		11,403,860	11,244,788	11,088,100	10,933,759	10,781,728	10,631,972	10,484,457	10,339,147	10,196,009	10,055,009	9,916,115
	Variation		-	-	-	-	-	-	-	-	-	-	-
	NPV	-93.75											
TOTAL	Variation		3,857,755 -	3,711,478 -	3,567,519 -	3,425,842 -	3,286,412 -	3,149,194 -	3,014,153 -	2,881,255 -	2,750,466 -	2,621,753 -	2,495,084
	NPV (2012 base year)	-28.15											

APPENDIX FIGURE D.84 SCREENSHOT FROM ADMIN COSTS OUTPUTS: TOTAL NET IMPACTS INCLUDING FEES

Total Impacts	NET BENEFITS				Cost coverage	
	Admin C. Model	IA Calculator	ERA/NSA authorisation fees loss	Total		
Option 2 & 6						
NPV (2012 base year)	9.3	439.00	-28.15	420.17		
Option 3 & 6						
NPV (2012 base year)	25.4	474.00	-28.15	471.29		
Option 4 & 6					160%	Revenue sharing 4.a
NPV (2012 base year)	32.7	503.00	-28.15	507.56	107%	4.b
Option 5 & 6					53%	4.c
NPV (2012 base year)	-69.0	574.00	-28.15	476.81	34%	