EUROPEAN UNION AGENCY FOR RAILWAYS

Moving Europe towards a sustainable and safe railway system without frontiers.

ESG Task Force on Standard Inputs for Economic Analyses

Final Report

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Contents

1. Executive Summary

The Economic Steering Group (ESG) is a standing advisory working group of the EU Agency for Railways composed of experts from the rail sector, academia and national safety authorities. On roughly an annual basis, the ESG sets up Task Forces (TF) which, based on terms of reference, deliver specific piece of work supporting the economic analysis practice of the Agency. The ESG TF on Standard Inputs for Economic Analyses was composed of rail sector experts as well as economic experts of national and international institutions and academia dealing with rail economics and use of cost data for their own purposes. This ESG TF delivered over a bit more than a year on the fundamental knowledge gap regarding average reference values of cost of railway assets and operations and other metrics useful to perform Cost-Benefit Analyses in railways. The key deliverable of this ESG TF is a first release of the Railway System Data Inventory (RSDI) which is a repository of detailed indicators showing indicative values of ranges of cost of railways in several subsystems at EU level. The RSDI values/ranges are only indicative and are not statistically sound for the EU rail sector. The RSDI primarily provides information of an order of magnitude nature as the majority of the single values/ranges derive from anonymous surveys of rail sector companies. Therefore, the robustness, representativeness and accuracy of the published RSDI values/ranges cannot be measured and, consequently, not guaranteed. Although still partial on all possible dimensions of the EU rail sector's subsystems and likely to be improved over time, the RSDI provide a useful and sound source of information for economic analysts and researchers that need to find reference data for their work in rail economics. The RSDI will continue to be updated and expanded on an annual basis, aiming to make it grow over time in accuracy, representativeness and robustness.

2. List of abbreviations

ACER	European Union Agency for the Cooperation of Energy Regulators	FSR	Florence School of Regulation
AERRL	Association of European Rail Rolling Stock Lessors	GDPR	General Data Protection Regulation
CBA	Cost-Benefit Analysis	ITF	International Transport Forum
CCS	Control Command and Signalling	MARS	Monitoring, Analysis, Research and Stakeholders Unit of ERA
CER	Community of European Railway and Infrastructure Companies	NRA	National Regulatory Authority
CINEA	European Climate, Infrastructure and Environment Executive Agency	NSA	National Safety Authority
DG MOVE	Directorate-General for Mobility and Transport	OECD	Organisation for Economic Co-operation and Development
DG REGIO	Directorate-General for Regional and Urban Policy	RB	Representative Body of ERA
DMT	ERTMS Deployment Management Team	RSDI	Rail System Data Inventory
DZSF	German Centre for Rail Traffic Research at the Federal Railway Authority	TF	Task Force
EIB	European Investment Bank	TSI	Technical Specifications for Interoperability
EIM	European Rail Infrastructure Managers association	UIC	Unit Investment Costs
ERTMS	European Rail Traffic Management System	UIP	International Union of Wagon Keepers
ESG	Economic Steering Group of ERA	UNIFE	Association of the European Rail Supply Industry

3. Background

3.1. Standard Inputs for Economic Analyses

Standard inputs for economic analyses are data items commonly used in economic analyses, especially cost-benefit analyses. They are often average values or ranges, where possible, representative of a broad geographical or sectorial coverage. Standard inputs are not statistics, they are rather approximate unit values of dimensions or indicators that can save time in the development, for example, of cost-benefit analyses (CBAs) and economic impact assessments. Standard inputs are useful for economists and analysts to have reliable information on order of magnitude of certain costs or dimensions. This allows a selection of more robust assumptions for CBAs and can help to achieve greater consistency and comparability between different CBAs. Moreover, when standard inputs are published, the accessibility for authors of analyses is optimal and the referencing facilitated.

Lists of standard inputs are not meant to impose reference values but rather to provide a single repository of sources from which different authors may also deviate, with good reasons to be stated, in their reports and CBAs. Individual economic studies may become a reference point in literature for accessing standard inputs, examples include the 2019 Handbook on external costs for transport by CE Delft[1]. In rail economics, similar reference sources are not really available, besides the 2001 study Prices and costs in the railway sector by Prof. Baumgartner and the 2018 Assessment of unit costs (standard prices) of rail projects (CAPital EXpenditure) by the DG REGIO of the European Commission which are now outdated.

3.1.1. The experience of the aviation sector

Eurocontrol is the European Organisation for the Safety of Air Navigation, an international organisation working to achieve safe and seamless air traffic management across Europe. Founded in 1960, Eurocontrol currently has 41 member states and is headquartered in Brussels, Belgium. Among other things, Eurocontrol provides technical and economic advice in the context of CBAs for EU-funded projects in the field of Single European Sky technologies.

Since several years, Eurocontrol is publishing a set of standard inputs for economic analyses updated annually. These values provide a set of standard inputs for data commonly used in economic and financial air traffic management-related analyses and appraisals. The Eurocontrol's set of standard inputs is not based on a legally mandated data collection but it is rather a single repository of data collected from public sources, studies and Eurocontrol's in-house data validated by industry stakeholders. The first version of the standard inputs report had a small set of values covered, overtime the list of indicators captured grew substantially.

3.1.2. The experience of the energy sector

The European Union Agency for the Cooperation of Energy Regulators (ACER) headquartered in Ljubljana, Slovenia, is an independent EU body to foster the integration and completion of the European internal energy market for electricity, natural gas and hydrogen. The Agency also supports the cooperation between the European Union and national governments by pooling technical and specialist expertise. By fostering cooperation among National Regulatory Authorities (NRAs), ACER ensures that the integration of national energy markets and the implementation of legislation in the Member States are done according to the EU's energy policy objectives and regulatory frameworks.
As per Art. 11(9) of Regulation (EU) 2022/869, ACER is establishing and publishing Unit Investment Costs (UIC) as infrastructure reference costs for projects of different energy infrastructure categories. These are historical data on unit cost of equipment and different types of infrastructure. The UIC are averages established on the basis of a mandatory survey of project promoters. For each project, submitters are

[1] At the time of publication of this report, a new study to be published in 2025 by the European Commission is on-going to update the CE Delft report.

required to provide some technical details and historical total cost data divided in installation and civil works, engineering and commissioning, materials and manufacturing, project management, regulatory and consent, studies and surveys, other costs. It is understood that each project is different, however UIC aim to provide at EU level reference values that are a useful indication of ranges of costs.
ACER collects all the relevant data through a protected web tool that ensures full protection of confidential data, anonymisation through specific viewing and access rights and security. The tool is operated by ACER and has been developed in consultation with the industry, the NRAs and the Commission.

3.1.3. The challenges of economic analyses in rail

The current lack of standard inputs values does not allow a smooth production of economic analyses on rail economics, safety and interoperability as well as a holistic view on the rail sector performance and competitiveness. Statistical information is available at EU level from Eurostat, the DG MOVE of the European Commission, the Agency and its registers, and the International Union of Railways, however data are mostly of generic, aggregate and high-level dimensions and of not outstanding quality due to data gaps in countries, time series.

Policy makers need robust impact assessments for proposing new legislation which is based on evidence and data. Therefore, quantitative economic analyses using modelling and CBAs have to rely, as a recurrent and time-consuming task, on broad data collection efforts. Techniques include public surveys, consultations, focus groups, structured interviews, access to datasets and registers. Stakeholders in the EU rail sector are made of many companies and the national features for each market, product or service are remarkable. When data are scarce, not available or suitable, analysts often need to perform approximations through interpolation or bold assumptions which may not be sound to represent dimensions at EU level. Models and CBAs performed in a study may be used as a reference for future analyses, however, as the related data collection is made for a specific purpose, the re-use of data and information is often not possible. Moreover, sources and model assumptions are not always clearly stated, models may be proprietary and authors may not explain in detail how they created or collected certain economic values based on indicators often too generic.

4. The ESG Task Force on Standard Inputs for Economic Analyses

Alongside other international organisations, the EU Agency for Railways is producing economic analyses to support its activities. In particular, the Agency is required by Art. 8 of Regulation (EU) 2016/796 to conduct an impact assessment for all its recommendations and opinions. These are usually addressed to the European Commission in the field of rail safety and interoperability. Many of the impact assessments are produced for the recommendations issued as per Art. 5 of Directive (EU) 2016/797 which aim at amending or updating the Technical Specifications for Interoperability (TSIs).

Following the last revision cycle of the TSIs resulting in a major update of the EU legal framework for technical and operational standards of several rail subsystems, the EU Member States and the rail sector representatives asked the Agency to produce more quantitative impact assessments and CBAs in the future. This was also formalised by the European Commission in August 2024 in its new request for recommendations for a new multi-annual TSI revision framework 2026-2030 and beyond.

Producing quantitative impact assessments require substantial resources and access to relevant data. The Agency is faced with limited human resources in its Economic Analysis and Research programme[2] as well as a lack of reliable rail economic data. The purpose of this ESG TF is also to upgrade the toolbox at the disposal of the Agency to deliver more quantitative impact assessments with restrained resources. Making data

[2] The Single Programming Document is detailing the ERA Work Programme and allocation of its human resources over single and multiple years. The Economic Analysis and Research Programme has a yearly overall allocation of about 5 FTE, however impact assessments (together with ESG, ESG TF and ex-post evaluations) are staffed with less than 2 FTE.

available for impact assessments is a legal obligation of Member States and the sector as per Art. 8(4) of Regulation (EU) 2016/796, but this ESG TF aims to comply with such provision by creating standard inputs for economic analyses in rail on the basis of a cooperative approach between the Agency and its stakeholders.

4.1. The objectives and scope

This ESG Task Force was set up by the ESG which is the Agency's standing working group with rail sector representatives on economic matters. Terms of reference have been reviewed in April 2023 by the ESG members prior to the start of the TF. The objective of the TF was to develop a reliable, user-friendly and published list of standard inputs for rail-related economic analyses as well as to provide recommendations on how to collect and treat those data, especially unit costs, which are deemed relevant but considered confidential by the corporate stakeholders. This is a normal concern as rail sector stakeholders are companies competing in the market and, additionally they have to respect certain internal policies for data disclosure to protect their business interests. The ESG asked the TF to provide also recommendations on the most efficient ways to keep the newly created list of standard inputs up-to-date.
The list of standard inputs is to be understood as a single repository of reference values at EU level represented by clear indicators and average single values or ranges. Standard inputs were collected from available public sources and reviewed by the ESG TF. Moreover, for those inputs experiencing a knowledge gap thus not existing in literature but deemed as relevant, ad hoc surveys of rail industry stakeholders complemented the list of standard inputs. Surveys have been a key focus of the TF as the indicators selected as standard inputs were often highly technical, of a high degree of granularity and detail which is often not available from secondary sources. Available standard inputs from literature also proved to be very often imprecise, too generic or based on unclear methodologies and definitions.

The overall objective of the list of standard inputs is to make available indicative average unit values and data that are agreed, usable, referenced, validated and when possible standardised from an EU level perspective. This will hopefully facilitate the production of quantitative impact assessments and economic analyses by the Agency as well as by other organisations and the public. In fact, beside the Agency, other organisations may find useful to access a list of standard inputs for their economic analysis work in rail. These include for example:

- Railway sector organisations submitting Change Requests on TSIs which need to be accompanied by an economic analysis for pre-assessment;
- Consultancies, the European Commission, national authorities, trade associations performing rail sector studies, analyses, reports;
- Finance and banking experts performing CBAs;
- Experts in market research, business intelligence;
- Academics and research centres.

A key challenge to deliver on the overall objective of this TF has been the effort of different organisations in building a repository of standard inputs not linked to a specific purpose or assignment. In fact, creating such a list of reference data would have not been possible without the continuous engagement, the regular communication and the transparency in explaining the generic purpose and the internal processes of the TF.

The scope of the indicators included in the first list of standard inputs covered the whole railway subsystems with a focus on interoperability and operations. The indicators composing the first list of standard inputs include data on purchase costs, economic lifecycle, maintenance, utilisation, operations, energy consumption of assets in the fields of rolling stock, infrastructure as well as a special focus on ERTMS equipment track-side and on-board.

4.2. Composition and working arrangements

Following the decision to setup the ESG TF, the Agency addressed in June 2023 a call for nomination of experts to the ESG as well as to all its Representative Bodies that are the trade associations representing the interests of rail sector stakeholders at EU level. Moreover, with the aim of putting together rail sector representatives together with experts and international bodies that produce different economic analyses in rail, the Agency solicited applications also from organisations outside of its usual Representative Bodies. The reason of this choice was to put together within the ESG TF the data supply side (rail sector stakeholders able to provide data) with the data demand side (those making use of data for producing economic analyses in rail).

The mixed composition of the ESG TF allowed a rare occasion of exchange in a forum between experts involved in economic analyses in rail. To guarantee equality and transparency, all TF members have been invited to all meetings and got the same access to information. However, given the length and intensity of the work of the TF, a better approach would have been to setup a subgroup dedicated to focussed work between the Agency and the rail sector representatives while involving the whole TF, with those organisations more on the data demand side, only during plenary meetings. In fact, a substantial part of the TF work has been dedicated to defining with the rail sector definitions and scope of indicators for the list of standard inputs. This was particularly important during the preparatory stage of surveys addressed to rail sector companies. Such discussions have been sometimes of a very technical nature which are less relevant for those organisations wishing to make use of data for producing economic analyses. An internal organisation of the TF with a plenary and a subgroup dedicated to rail sector representatives would have increased the level of engagement of all participants and limited in a more targeted way the time organisations more on the data demand side dedicated to the TF.

4.2.1. Members

The ESG TF had a mixed and broad composition of about 40 experts involved or interested in economic analyses in rail. The rail sector experts present in the TF represent more than half of the rail market in Europe. The Agency steered the activities of the TF and provided the chair of the TF, IT tools, the secretariat to prepare the meetings, the documents, the logistical arrangements and catering for certain meetings.

<table>
<tr><th colspan="2">Rail Sector ERA representative bodies</th><th colspan="2">Other organisations</th></tr>
<tr><td>CER[3]</td><td rowspan="2">UNIFE[4]</td><td>ITF (OECD)</td><td>NSA Finland</td></tr>
<tr><td>EIM</td><td>EIB</td><td>FSR (EUI)</td></tr>
<tr><td rowspan="2">AERRL</td><td rowspan="2">UIP</td><td rowspan="2">Politecnico di Milano</td><td rowspan="2">European Commission (DG MOVE, DG REGIO, Eurostat)</td></tr>
<tr><td></td></tr>
<tr><td colspan="2"></td><td>DZSF</td><td>CINEA</td></tr>
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All experts participating in the TF were not remunerated by the Agency for their work nor for their expenses. According to the terms of reference of the TF, an average of 1,6 person-day per expert per month was estimated in terms of effort for meeting preparation, attendance and follow-up activities. However, due to

[3] UIC was also represented through CER to ensure a link with the UIC Statistics Platform
[4] During the work of the TF UNIFE secretariat did disseminate the surveys, however, UNIFE members did not support the submission of data until technical and legal aspects are/were clarified; so no replies were received from UNIFE members. However, UNIFE experts appointed in the TF continued to contribute by providing advice and expert judgement during the entire duration of the TF.

the higher than foreseen intensity of the work, 2 person-day per expert per month were eventually spent by the most engaged rail sector experts. The effort spent by the rail sector representatives has been particularly intense given the work needed also outside of the TF. This included the internal coordination within each trade association and within each (sometimes) large rail company for consulting very diverse expertise to feedback on all the rail subsystems covered by the indicators in scope of the TF.

4.2.2. Cooperative working approach

To deliver on the key objective of this TF, considering also the key challenge of building a repository of standard inputs across many rail subsystems without a link to a specific Agency impact assessment or study, a cooperative working approach between the Agency and stakeholders was effectively established. The ESG TF worked effectively together, with open communication and mutual understanding, as one team and members provided useful expert opinions, insights, challenges and constructive criticisms that allowed the TF to deliver on its objective. For the Agency, it has been particularly important the strong working relationship with the rail sector representatives that allowed on one side to enrich the technical discussions and on the other side to raise awareness about the purpose of this TF across the member companies of the representative bodies.

4.2.3. Timeline and meetings

The ESG TF kicked-off, following the selection of experts, on 10 October 2023 and ended in February 2025. The initial work plan was to conclude the work in June 2024, however due to the complexity of work around the design of surveys and the necessary extended time allowed for surveys to be responded by rail sector companies, the duration of the TF has been extended. Such extension has been positive as for many indicators rail sector companies needed internal coordination, review, amendments or approvals due to the technical or sometimes (potentially) business sensitive nature of certain data.

Instead of the initially foreseen 6, a total of 10 meetings have been organised most for a duration of 1-2 full day meetings. Nearly all meetings took place in hybrid format via TEAMS and on site in Brussels, Paris, Valenciennes, Florence where different TF members offered to provide meeting room premises. Having all meetings as hybrid allowed more experts to join the meetings but also to have effective and frank discussions in meeting face-to-face. Given the challenge of engaging all TF members in the delivery of the objective of the TF, on site presence during meetings has been particularly important.

4.2.4. IT tools

The ESG TF used as IT tools emails, MS Team for hosting hybrid meetings and an Agency's dedicated sharepoint Extranet space to store relevant documents and files. For collecting data, the free-of-charge tool EUSurvey administered by the Agency has been used to run the surveys foreseen in this TF. A functional mailbox has been also used to provide assistance to survey respondents in case of need.

5. The key deliverable: Railway System Data Inventory

5.1. The legacy indicators

The Railway System Data Inventory (RSDI) is an internal repository of standard inputs for economic analyses built by the Agency over the last ten years. As noted also in the Agency's procedure for impact assessments, the RSDI is primarily an enabling working tool listing about 450 indicators about unit costs and other metrics sourced by literature as well as past impact assessments and studies produced by the Agency in-house. The RSDI, covering all rail subsystems, grew over the years, however its usefulness as a source for Agency's

economic analyses reduced lately as the data and the information contained therein became more and more outdated. Moreover, as the RSDI relies on literature, the data are as good as the source is. For instance, the granularity of information is often insufficient and the methodology or robustness of certain reference values is unclear or unverified.

In line with the initial objective, a first task of the TF has been to review the list of existing indicators and relevant data contained in the RSDI by checking their completeness, clarity, usefulness, accuracy. As per the initial plan, the first idea was to survey rail sector companies on data already available from literature in order to verify their accuracy and current meaningfulness. The Agency took the approach of screening the entire set of RSDI indicators with the TF which resulted in an excessive workload for the experts risking discouraging experts' commitment and to divert focus from the objective of the TF. Instead, the screening of the RSDI should have been focussed on a selection of the existing 450 indicators based on usefulness and at least a generic link to upcoming Agency activities, impact assessments or studies in the field of economic analyses.

The legacy indicators contained in the RSDI have been eventually not retained except for few exceptions where literature was deemed as reliable. A notable example is the 'Assessment of unit costs (standard prices) of rail projects (CAPital EXpenditure)' by the DG REGIO of the European Commission that has been considered a robust but outdated source. The ESG TF therefore updated the relevant unit cost values on rail infrastructure as outlined in Annex 2 of this report. The main reason for literature being unreliable is linked to the lack of clarity of in terms of granularity, metrics and representativeness of the relevant indicators for railways. During Q1/Q2 2024, a final major short-listing of legacy indicators came down to about 70 indicators which have been however carefully re-designed in terms of definitions, description, metrics and scope by the ESG TF. This list of indicators became the basis for the first survey of the ESG TF, however for many of them survey respondents have been required to provide data rather than, contrary to the initial idea of legacy indicators in the RSDI, to verify data available from literature.

5.2. The design of new/revised legacy indicators

5.2.1. Methodology

A key feature of the ESG TF has been its mixed composition of experts representing the data supply side (rail sector stakeholders able to provide data) with the data demand side (those organisations making use of data for producing economic analyses in rail). An important objective of the ESG TF is to fill the knowledge gap of certain reference values in rail that do not allow an easy production of economic analyses at EU level. Therefore, after the lengthy screening of the data and sources available in the legacy indicators of the RSDI, all TF members including the Agency have contributed to design new indicators for the RSDI not existing before as well as to revise pre-existing indicators by making them clearer in terms of definitions, more granular, more targeted and more understandable by external parties. This has been particularly important for the design of surveys which have been addressed to hundreds of rail sector companies.

All indicators have been assigned an ID number and have been listed in xls tables available to all ESG TF experts in the dedicated Extranet space. During the screening of different indicators, the ID number became a guiding reference for certain sub indicators, however the same ID should be kept and never changed during the survey design stage.

5.2.2. Ideas for new indicators

After the revision of legacy indicators, in June 2023 all TF members have been invited to propose ideas for new indicators. This has been the main task in the TF especially for those organisations, including the Agency, on the data demand side (those organisations making use of data for producing economic analyses in rail), that perceive a knowledge gap in certain areas of rail subsystems and economics. A total of 100 proposals

for new indicators have been received from EIB, AERRL, Politecnico di Milano, EIM and the Agency. A shortlisting has been performed by the ESG TF.

The Agency's proposed new indicators have been inspired primarily by the topics of the latest request for recommendations for a new multi-annual TSI revision framework 2026-2030 and beyond received by the Commission in August 2024. In fact, the Agency wished to advance data collection for such new indicators in view of the impact assessments and additional studies to be performed in the upcoming months and years. A key focus category for the Agency's proposals has been ERTMS where the Deployment Management Team (DMT) of the Commission has been involved in providing advice for the design of new indicators. In fact, an important knowledge gap to be addressed regards the recent trends of costs for ERTMS equipment and authorisations' length which are important for Agency's work as well as for the monitoring task of the DMT.

5.2.3. Final selection of indicators

The selection and revision of legacy indicators and the design of new indicators across all rail subsystems to be fed from surveys have been driven by the following criteria:

- Relevance for mid to long-term potential policy needs and usefulness in terms of perceived knowledge gap
- Likelihood of data availability
- Easiness of data provision and clarity of definitions/descriptions of indicators
- Degree of business sensitivity for rail sector companies

The total indicators eventually retained for the first list of standard inputs in the RSDI are 89 out of the initial 151[5] which have been fed through surveys of rail sector companies covering purchase costs, economic lifecycle, maintenance, utilisation, operations, energy consumption of assets in the fields of rolling stock, infrastructure as well as a ERTMS track-side and on-board.

5.3. The three surveys of rail sector companies

A core activity of the ESG TF has been to feed indicators for the RSDI through web surveys addressed to rail sector companies. A total of three surveys has been organised during the TF:

- **Survey n. 1:** open from 28 June 2024 till 11 November 2024, made of 68 indicators covering mostly the revised legacy indicators covering rolling stock, operations and infrastructure;
- **Survey n. 2:** open from 18 November 2024 till 17 January 2025, made of 39 indicators covering mostly the newly proposed indicators covering rolling stock, operations, trackside ERTMS and infrastructure;
- **Survey n. 3:** open from 18 November 2024 till 17 January 2025, made of 44 indicators covering only the newly proposed indicators on on-board ERTMS and related CCS activities.

All web surveys have been designed by the Agency and dispatched by the ERA representative bodies to all their member companies. Each association received a dedicated replica of each survey for its members allowing all participants to view and access the same survey content but within the membership of their association. Survey respondents could opt to remain anonymous, the only information visible to the Agency staff in charge of analysis of the survey results being the association to which a respondent belongs to.

The response rate has been rather low, but in line with previous surveys performed by the Agency for its assignments. Following the closing of survey n. 1, upon proposal of the Representative Bodies, the Agency organised group presentations to individual member companies of CER and EIM to further explain the purpose of the surveys and the aim of this ESG TF. However, the values/ranges for nearly all indicators that

[5] The actual number of indicators is actually a bit less as many batches of indicators are made of a group of sub-indicators representing the same metric/concept but different technical details or reference characteristics. For example, the cost of maintenance of ERTMS trackside is split into two sub-indicators for ERTMS Level 1 and Level 2.

could be calculated based on the three surveys of the ESG TF, resulted being plausible according to the rail sector's ESG TF experts.

- **Survey n. 1:** 18 replies received, however 4 invalid as no data were submitted;
- **Survey n. 2:** 15 replies received, however 6 invalid as no data were submitted;
- **Survey n. 3:** 6 replies received, however 1 invalid as no data were submitted.

5.3.1. The tool EU Survey

For collecting data, the free-of-charge tool EUSurvey offered to the public by the DG DIGIT of the Commission has been used to run the web surveys of this TF. The tool is GDPR compliant and the relevant terms of use are easily accessible. The Agency has been the surveys' administrator and performed the necessary design of the surveys on the basis of the indicators, description and metrics decided by the ESG TF during relevant meetings.

EUSurvey proved to be a sufficiently reliable and user-friendly tool for survey respondents, ensuring a sufficient degree of security and accessibility. Some additional features or functionalities could have been welcome but EUSurvey was chosen by the ESG TF as the most appropriate tool. The Agency considered procuring a dedicated webtool, however, beside the budgetary implications, the relevant tendering procedure would have not allowed a timely availability of the tool for use within the work plan of the TF. One important issue was experienced during survey n. 1 with regards to data starting with a decimal digit. The results of the related indicators have been compromised and the same indicators had to be surveyed again in survey n. 2 alongside the newly proposed indicators.

All surveys could be branded in EUSurvey with the Agency logo and a cover letter could be added to outline the purpose of this data collection in a formal-looking EU setting giving to respondents also a sense of data security. The tool allowed also to attach relevant documents available to survey respondents such as the terms of reference of the ESG TF and the terms sheet regulating the data collection and analysis within the ESG TF. Access to the survey has been restricted with a password dedicated for the member companies of each ERA Representative Body. ESG TF members have also been provided with a separate xls file mirroring all indicators in the surveys, each with an assigned ID number. This facilitated data aggregation especially in very large companies where multiple experts/departments had to be consulted. The Agency in fact invited participating organisations to assign the data input role in EUSurvey to a single individual acting as coordinator. This mitigated the risk of multiple survey replies from the same organisation.

For the Agency survey's administrator role, EUSurvey resulted being particularly cumbersome during the design stage of the surveys and during the analysis of results. In fact, EUSurvey is more suited for short surveys collecting qualitative responses to questions from respondents active in one country. On the contrary, the surveys of the ESG TF were rather long aimed to collect quantitative data from rail sector companies active in multiple countries and businesses. The design limitations of EUSurvey obliged to list indicators and questions into rather long tables that respondents had to go through.

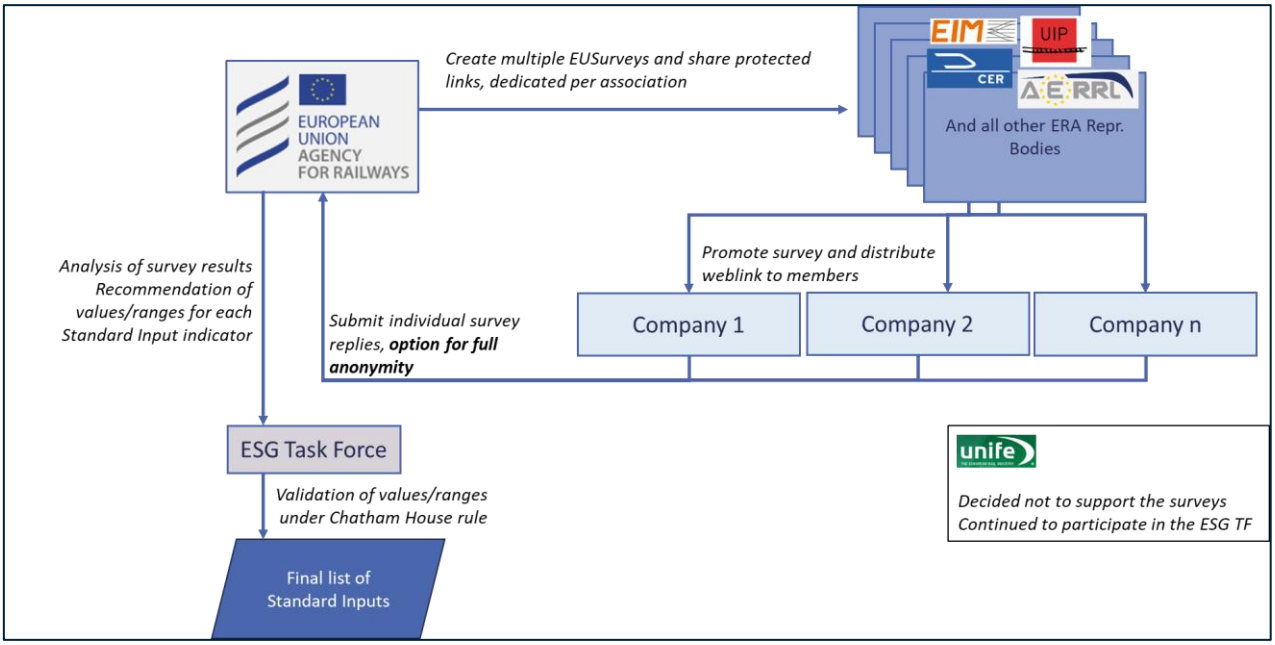
5.3.2. The Terms Sheet for the data collection process

Most of the indicators present in the surveys relate to unit costs. The ESG TF rail sector representatives expressed concerns regarding the success rate of many of the proposed indicators due to the business sensitivity of these for rail sector companies. Therefore, it has been decided to draft a formal Terms Sheet to outline the process of survey dissemination, access to the survey results restricted to the Agency and process of review of aggregated values/ranges by the ESG TF as a result of Agency's data analysis.

All data collected and processed have been collected for the sole purpose of drafting and delivery of this report and its annexes. The ESG TF did not pursue any other purpose and in particular did not get involved in any kind of cooperation or exchange which could be perceived as falling within the scope of fair competition.

No data regarding individual companies' costs or prices has been shared or discussed in the meetings of this TF. The Terms Sheet is available in Annex 3 but the key principles can be summarised as follows:

- Each association receives a dedicated survey, password protected, which is a replica of the same survey;
- Associations have no access to the survey responses as each company submits data in EUSurvey independently and only the Agency can view the individual survey submissions;
- Each respondent may opt for anonymity. The only information known to the Agency is to which association a respondent belongs to;
- For those respondents not opting for anonymity, only the Agency has access to their data and identity;
- During the plausibility check, the ESG TF reviews only aggregated values/ranges proposed by the Agency for each indicator. No meeting minutes and no recordings are taken when discussing plausibility of results;



The Agency is particularly praised for the trust the ESG TF rail sector representatives have shown with regards to the central role of survey responses and analysis the Agency staff had performed.

5.3.3. The Methodology for survey results analysis

All survey results have been analysed by dedicated Agency staff from the MARS Analysis Team. Having most of survey respondents anonymous proved to be a challenge in terms of weighting different results by the type, size or location of respondents. Agency staff therefore proposed to the ESG TF values for the large majority of indicators as ranges covering the lowest and the highest response received and considering (where available) data pre-existing in literature from the legacy RSDI. Certain outliers have been excluded by applying expert judgment. All survey respondents provided fairly recent information dating mostly 2022 and not earlier than 2018.

5.3.4. The Plausibility check for the RSDI values

A key step to ensure the list of standard inputs in the RSDI is reliable and representative has been the plausibility check during meetings of the ESG TF of the values proposed by the Agency. As stipulated in the agreed Terms Sheet, only the Agency had access to EUSurvey and each ESG TF member has been presented only aggregated values/ranges for each indicator calculated by the Agency following the analysis of surveys' results. This and other arrangements have been agreed in the Terms Sheet but having discussions off the records among rail sector ESG TF experts allowed to review the plausibility of the RSDI values without compromising corporate disclosure policies in relation to, for example, cost data. Moreover, no data regarding individual companies' costs or prices has been shared or discussed in the meetings of this TF. During all relevant meetings, minor adjustments have been performed to the values/ranges proposed by the Agency that resulted being fairly robust despite the small base of survey responses on which they have been constructed.

5.4. Access to the final values for the RSDI

5.4.1. The value of a published RSDI

In line with the ESG TF terms of reference, the first release of the RSDI is published on the ERA website at the disposal of the public. This allows easy access to a batch of standard inputs that can facilitate the work of analysts performing economic analyses in rail. The public is also invited to provide feedback to the Agency about specific indicators as additional data and information can help to refine certain RSDI values/ranges in the future, making the repository more accurate, more representative and more up to date. A knowledge sharing about the use of indicators made available is also recommended to all authors.

At the same time, the way in which the RSDI published values have been constructed and checked during plausibility meetings, allows on side a certain robustness of the indicators published but also avoids all concerns regarding business confidentiality of companies. In fact, the aggregated and generic nature of RSDI values does not allow one to reconcile the results of a specific indicator to an individual survey respondent.

5.4.2. Key disclaimer and use of RSDI values

Certain key statements must be made regarding the use and interpretation of RSDI values in this report:

- The RSDI values/ranges are indicative only. They are not statistically sound for the EU rail sector and primarily provide information of an order of magnitude nature;
- The majority of the RSDI values/ranges derive from anonymous surveys of rail sector companies. Their robustness, representativeness and accuracy cannot be measured and, consequently, not guaranteed;
- The Agency cannot be held responsible for errors or inaccuracies of the RSDI. Nevertheless, the the values/ranges are considered plausible on the basis of the ESG TF expert judgment and can be used/referenced in economic analyses in rail;
- Reproduction of RSDI values/ranges is permitted if they are credited to the European Union Agency for Railways as the source. In addition, any reference must include the disclaimer '*the value estimated is indicative*'. Authors making use of the RSDI are encouraged to share their work, studies, or reports with the Agency.

5.4.3. The Final values of Standard Inputs for the RSDI

The single values or ranges published as Annex 1 to this report are the first public release of the RSDI. They cover the following dimensions of the railway subsystems for a total of 89 indicators. Nearly all indicators have been sourced by the three surveys run during this ESG TF.

5.5. Key recommendations for future updates

The ESG TF believes that substantial effort has been spent in the production of the first release of the RSDI as repository of standard inputs for economic analyses in rail. The value of a repository is relevant only if it is kept up-to-date and especially unit cost information tends to become obsolete rather quickly due to market developments and inflation. The ESG TF recommends that the RSDI is kept up to date as a standing activity of the Agency's Analysis Team. In particular, the update work could envisage the establishment of a permanent working group as mirror of the ESG in charge to meet – when required – at least once a year to:

- Review the RSDI indicators and update description and/or values based on feedbacks received by the Agency from the public through a functional mailbox;
- Consider and approve proposals for adding new indicators to the published RSDI on the basis of novel literature becoming available[6] and/or specific Agency assignments for which relevant data have been collected. New indicators may also be added to a separate repository with no public access;
- Consider removing indicators of the RSDI becoming obsolete;
- Create new indicators for the RSDI to meet knowledge gaps in rail economic analyses and collect relevant data through surveys;
- Provide recommendations to the ESG and to the Agency on standard inputs for economic analyses and on their use in ERA assignments and/or external publications.

6. Conclusion

The ESG TF considers the objectives of its work have been fulfilled. The first release of the RSDI of standard inputs for economic analyses is a first in the EU rail sector and the TF believes an important knowledge gap about rail economics will be closed. The EU rail sector is particularly broad in terms of subsystems, stakeholders, market players, national specificities, technical characteristics and, as a consequence, products and services are highly customised. This first release of the RSDI standard inputs could not cover all aspects and important knowledge gaps remain. However, we believe a useful source of reference values has been made available to the public and this will facilitate the production of quantitative economic analyses on the rail sector.

[6] The European Commission is expected to publish end of 2025 an update of the 2019 Handbook on the External Costs of transport which is a key source of standard inputs in the field of environment.

7. Annex 1 : First release of the RSDI

See xls file published and updated annually on the ERA website.

8. Annex 2 : DG REGIO data updated with methodology

The 2018 Assessment of unit costs (standard prices) of rail projects (CAPital EXpenditure) by the DG REGIO of the European Commission is robust source of unit costs for rail. Several studies, carried out in the past, highlighted the difficulty of assessing the delivery efficiency of capital investments in rail infrastructures due to the various interacting elements involved, such as the project features, the technical complexities and the political, regulatory and natural differences that can be found across the Member States. Unfortunately, this study has not been updated since its publication and the refined statistical analysis of projects to come up with average unit costs of assets and works is outdated.

The ESG TF considered the opportunity to include the definitions and values in its surveys serving to update knowledge for the RSDI. However, the level of detail of the definitions used in the DG REGIO project were found to be not granular enough for the needs of the TF. It was therefore decided to include an update of the DG REGIO aggregate unit cost figures as a separate deliverable available in this report annex and outside of the RSDI repository.

The main issue affecting the up-to-date validity of the DG REGIO values is inflation. However, there is no index available from Eurostat suitable to rail infrastructure works and assets. The ESG TF therefore decided to use as proxy the index 'Construction producer prices or costs, new residential buildings - annual data' which has good coverage and considers both labour and materials prices.

The reader can find below the values from the DG REGIO report updated using the aforementioned index. The indicators are as per those used in the report and may overlap with some indicators present in the RSDI. The ESG TF consider the definitions used in the RSDI as more granular and the values/ranges proposed as more robust since a survey of rail sector stakeholders was conducted in 2024. The Q1/Q3 indicates the quartiles of the original dataset as certain outlier values have been excluded and ranges are presented for all the indicators.

Item	Q1 updated to 2022 prices	Q3 updated to 2022 prices	Unit of measurement
Total investment unit cost ranges: Construction Conventional New lines	8.53	11.78	M€/km
Total investment unit cost ranges: Construction High-speed New lines	14.66	20.25	M€/km
Total investment unit cost ranges: Construction Conventional Upgrade	4.38	10.72	M€/km
Total investment unit cost ranges: Construction High-speed Upgrade	2.67	10.70	M€/km
Total investment unit cost ranges: Construction Conventional Rehabilitation	2.18	3.49	M€/km
Total investment unit cost ranges: Construction High-speed Rehabilitation	0.84	1.39	M€/km
Total investment unit cost ranges: Construction Conventional Signalling, telecommunication and electrification	0.24	1.25	M€/km
Total investment unit cost ranges: Construction High-speed Signalling, telecommunication and electrification	0.18	0.81	M€/km
Construction unit cost ranges: Construction Conventional New lines	7.22	10.61	M€/km
Construction unit cost ranges: Construction High-speed New lines	14.49	20.42	M€/km
Construction unit cost ranges: Construction Conventional Upgrade	4.08	9.29	M€/km
Construction unit cost ranges: Construction High-speed Upgrade	2.18	9.95	M€/km
Construction unit cost ranges: Construction Conventional Rehabilitation	1.73	5.95	M€/km
Construction unit cost ranges: Construction High-speed Signalling, telecommunication and electrification	0.20	1.29	M€/km
Construction unit cost ranges: Construction Conventional Signalling, telecommunication and electrification	0.20	0.79	M€/km
Construction unit cost ranges: Base infrastructure Conventional New lines	4.63	6.26	M€/km
Construction unit cost ranges: Base infrastructure High-speed New lines	9.15	11.65	M€/km
Construction unit cost ranges: Base infrastructure Conventional Upgrade	3.25	6.90	M€/km
Construction unit cost ranges: Base infrastructure High-speed Upgrade	3.19	6.47	M€/km
Construction unit cost ranges: Base infrastructure Conventional Rehabilitation	1.96	5.72	M€/km
Construction unit cost ranges: Base infrastructure High-speed Signalling, telecommunication and electrification	0.21	0.78	M€/km
Construction unit cost ranges: Base infrastructure Conventional Signalling, telecommunication and electrification	0.25	0.99	M€/km
Unit cost of single components: Signalling	0.20	0.55	M€/km
Unit cost of single components: Signalling	0.51	0.72	M€/km
Unit cost of single components: Electrification	0.41	1.08	M€/km
Unit cost of single components: Electrification	0.62	0.87	M€/km
Unit cost of single components: Telecommunication	0.20	0.55	M€/km
Unit cost of single components: Telecommunication	0.20	0.27	M€/km
Unit cost of single components: Permanent way	0.53	1.20	M€/km
Unit cost of single components: Permanent way	1.05	1.68	M€/km
Unit cost of single components: Earthworks	0.39	1.84	M€/km
Unit cost of single components: Earthworks	3.20	5.22	M€/km
Unit cost of single components: Fencing	0.66	1.32	M€/km

9. Annex 3: The Terms Sheet for data collection

EUROPEAN UNION AGENCY FOR RAILWAYS

Moving Europe towards a sustainable and safe railway system without frontiers

Terms sheet on process for data collection and analysis

Procedure within the Economic Steering Group Task Force on Standard Inputs for Economic Analyses

	Authors	*Legal check done - only legal aspects verified*	*Approved by Process Owner*
Name	G. Potenza M. van Balen	K. Doulis	Torben Holvad
Position	Analysis Team Economic Evaluation Officers	Legal Officer	ESG Chair
Signature			

Document History

Version	*Date*	*Comments*
0.1	06/05/2024	First draft by ERA Analysis Team
0.2	30/05/2024	Final draft following ESG TF call on 28 May
1.0	07/06/2024	Final version approved by the ESG TF

PRO_ESG_001 V 1.0

1. Process	Core process > Impact Assessments > ESG Task Force
2. Process Owner	ESG Chair
3. Purpose and Customers	To describe the process for data collection and analysis of unit values or ranges feeding indicators of the Railway System Data Inventory (RSDI) as updated and refined within the context of the ESG Task Force on Standard Inputs for Economic Analyses (ESG TF). The process aims to: › Describe the data collection process through the EUSurvey web tool › Describe the data analysis of survey results by ERA staff › Describe the validation of results by the ESG Task Force ahead of inclusion into the RSDI The main customers are: › The ERA Representative Bodies and their members › Other rail sector corporate stakeholders › EU and National Institutions having/using relevant rail-related data › National Safety Authorities having relevant rail-related data › Academic Institutions having relevant rail-related data
4. Scope	The update of the RSDI with more robust and recent unit values or ranges to: › facilitate the production of impact assessments (IA) or other economic analyses by the Agency, other organisations and the public based on data accessible for them › limit the need for broad ad hoc data collection for every IA thus optimizing resources utilization of analysts and reducing burden on the rail sector › Better target surveys on data needs specific for each assignment The RSDI list of standard inputs is to be understood as a single repository of EU-level reference values which are: › Based on clear and agreed indicators and definitions; › Relying on robust literature and/or on rail sector experts' feedback › Rather indicative unit values or ranges not statistically significant, but sufficient for the intended purposes › If possible, geographically balanced and actualized › Defined at start and regularly updated, amended according to needs/new data availability The RSDI indicators are: › Not linked to an on-going impact assessment or single policy initiative by the Agency or by the European Commission › Not aiming to investigate specific companies / countries › Defined by the ESG Task Force members on the basis of a cooperative approach with the Agency and fed with data by rail-related stakeholders and other relevant organisations The RSDI indicators aim to be mostly based on available public sources and validated or updated by the ESG Task Force. However, for those inputs not existing or not available but deemed as relevant, data retrieved through web-based EUSurveys will complement, amend or update the list of standard input values in the RSDI. The indicators may include reference values, averages or ranges on units, for cost or price data on rail infrastructure, energy, rolling stock,

PRO_ESG_001 V 1.0

	operations and traffic management, employment, interoperability constituents and safety critical components, rail industry competitiveness, profitability provided that these indicators are not considered as confidential.
5. Legal basis	Art. 8(1), 8(4) and 38(4) of the Agency Regulation (Regulation (EU) 2016/796) Art. 5(3) of the Interoperability Directive (Directive (EU) 2016/797) This initiative aims to reduce the need for the Agency to collect data by enforcing the legal basis for each impact assessment from Member States, representative bodies and eventually individual rail sector stakeholders.
6. Linked with other (Sub)Processes /documents	› The terms of reference of the ESG TF on Standard Inputs for Economic Analyses › The call for nominations of ESG TF members addressed by ERA to the representative bodies during the summer of 2023
7. Process Input	› The revised short-listed indicators of the RSDI with stated definitions and metrics following ESG TF advice › The web surveys on a selection of RSDI indicators prepared by ERA using EUSurvey and dispatched to the representative bodies for dissemination to their members or dispatched directly by ERA to individual companies
8. Process Output and Performance	Process intermediate output: › Replies to the web surveys by individual companies validating aggregated unit data, ranges or averages proposed by ERA, or providing alternative data if possible or relevant, in reply to the RSDI indicators Process output › The values for the RSDI indicators proposed by ERA following analysis of the surveys' results are aggregated and to be validated by the ESG TF. No individual respondents' data will be shared by ERA and other ESG TF members Performance indicators: › Out of RSDI indicators in scope of the EUSurveys of the ESG TF, % of indicators retained and fed with values following validation by the ESG TF
9. Enablers	› Buy-in by representative bodies in disseminating and promoting the web surveys to their members › Accompanying cover letter by ERA outlining the purpose of the data collection › The EUSurvey web tool
10. Process Constraints	› Resource availability at ERA and within the ESG TF to analyse and validate the survey results

PRO_ESG_001 V 1.0

General Process Risks

Identified Risk	*Risk Level*	*Mitigation action*
The surveys are affected by a low response rate	High	The members of the ESG TF will ensure appropriate promotion of the initiative within the membership of their representative bodies and within their companies. They will communicate the value-added of developing a list of standard inputs for economic analyses to reduce the burden of ad hoc data collection for impact assessments and improve the quality and the quantification of analyses by ERA and others. ERA will provide an official cover letter that can accompany the dispatching of the web surveys. ERA will provide a xls file listing the survey content to facilitate ESG TF members internal follow-up of the survey within their organisations.
Multiple respondents to the survey from the same organisation	Medium	The instruction sheet of the survey will mention that one single input per organisation is foreseen. The ESG TF members and the identified representatives of each organisation within the representative bodies will try to act as single data entry point to the survey on behalf of their organisation.
Survey respondents do not understand the purpose of the data collection	Low	ERA will provide an official cover letter that can accompany the dispatching of the web surveys. The ESG TF will remain available for questions from their representative bodies' members. A functional mailbox will be created by ERA to process possible queries by respondents.
The survey results are not meaningful to feed a given RSDI indicator	Medium	ERA will perform a data analysis prior to the validation by the ESG TF of the proposed RSDI values. As the survey respondents can remain anonymous, ERA cannot perform robust plausibility or representativeness assessments of the values received for a given indicators.
Response rate to the survey per representative body not representative of its members	Medium	The members of representative bodies are sometimes national associations made of other dozens of companies. The relevant representative bodies will be asked to provide to ERA an indicative list of their direct single

PRO_ESG_001 V 1.0

		company members and – where possible – their indirect national associations members.
Survey results are compromised	Low	Reduce the possibility to identify individual organisation based on survey responses. Limit access to survey responses to restricted group of people. Maintain data within ERA internal protected environment.

1. Introduction

Decision-makers in companies need to run their business based on sound economic analyses. Similarly, policy-makers need robust impact assessments for proposing new legislation which is based on evidence and data. The Agency contributes to this by providing impact assessments (IA) for each of its Opinions and Recommendations[1]. The Better Regulation Agenda is the guiding framework for the European Commission and the Agency for the practice of impact assessments.

Data collection is a recurrent task for IAs and on the basis of Art. 8(4) of Regulation (EU) 2016/796, the Agency collects data from Member States and Representative Bodies. The availability and quality of data is a recurrent issue while developing IAs, particularly for the quantification of impacts. Currently, sector organisations provide data mostly on a haphazard, fragmented, uncoordinated basis. As this approach often relies on bilateral exchanges it comes with lower levels of confidentiality and thus less willingness of parties to provide data. This makes the development of quantified IAs cumbersome and resource intensive.

During the debates at the RISC Committee concerning the TSI revision 2023, several Member States and representative bodies acknowledged these issues, but nevertheless requested a greater level of quantification in future Agency's IAs as a key enabler for better policy-making.

In a context of scarce resources available at the Agency and a general low availability of quality data on railways at EU level, standard inputs for economic analyses can be an enabler to facilitate more robust and quantitative assessments. This has been the experience of the aviation and energy sectors[2]. Standard inputs are to be understood as reference values, units, ranges and averages of indicators, where possible with an EU-wide coverage. Standard inputs can save time in the development of cost-benefit analyses (CBAs) and economic impact assessments while facilitating also greater consistency and comparability between different analyses. Moreover, when standard inputs are published, the accessibility for authors of analyses is optimised and the referencing facilitated.

Standard inputs are not meant to impose reference values but rather to provide a single repository of robust data from which different authors may also deviate, with good reasons to be stated, in their reports.

The current lack of standard inputs impedes the efficient production of economic analyses on railway safety and interoperability and limits the understanding on rail sector performance and competitiveness.

The Agency's Economic Steering Group (ESG)[3] has been consulted in 2023 on the draft terms for reference to establish an ESG Task Force (TF) on Standard inputs for economic analyses. Following a call for nominations

[1] Regulation (EU) 2016/796 Art 8(1)

[2] Since several years, Eurocontrol is publishing a set of standard inputs for economic analyses updated annually. These values provide a set of standard inputs for data commonly used in economic and financial air traffic management-related analyses and appraisals. According to Art. 11(9) of Regulation (EU) 2022/869, The European Union Agency for the Cooperation of Energy Regulators (ACER) is establishing and publishing Unit Investment Costs (UIC) reference values for projects of different energy infrastructure categories. These are historical data on unit cost of equipment for energy transmission and average cost per unit of different types of infrastructure.

[3] The Economic Steering Group (ESG) is a permanent group of experts of the Agency made of representative bodies, academia, European Commission and other international organisations. The ESG focuses on the identification, estimation and evaluation of impacts generated from Agency's activities.

PRO_ESG_001 V 1.0

addressed by ERA to its representative bodies during the summer of 2023, the ESG TF kicked-off on 10 October 2023, will end its work end of 2024. Work on Standard Inputs may likely continue in the future in a different format that an ESG TF (e.g. a more permanent ERA working group).

2. Objectives

Within the ESG TF on Standard Inputs for economic analyses, this process aims to collect data to feed the RSDI indicators by either:

- Challenging the values of indicators currently available from literature
- For those indicators without robust reference in literature, providing new primary data to allow the ESG TF to validate new more robust values for the indicators

The availability of Standard input data will facilitate the production of quantitative impact assessments and economic analyses by the Agency, other organisations and to some extent the public. The overall objective of the standard inputs is to make available average unit values and data that are agreed, usable, referenced, validated and when possible clearly defined from an EU level perspective.

3. Scope

The scope of the RSDI indicators to be included in this process for data collection cover a broad set of areas of rail operations in the field of safety, interoperability and competitiveness. The initial input for the RSDI comprised some 400+ indicators, however, the list of indicators to be included in this process for data collection has been defined by the ESG TF which performed a short-listing of the broad range of RSDI indicators on the basis of:

- Relevance
- Relevant knowledge gaps in literature
- Maturity and easiness of defining definitions and descriptions for the indicators
- Mid to long-term potential policy needs in the field of safety and interoperability

The data collected through this survey process are only used to feed the RSDI indicators within the framework of the ESG TF on Standard inputs for economic analyses or within its envisaged follow-up activities beyond 2024. Certain data feeding RSDI indicators are available from literature and not subject to survey.

4. Key principles and assumptions

This process of data collection and analyses within the ESG TF on Standard inputs for economic analyses is based on the following key principles:

1. Data provision by survey respondents shall be facilitated to the maximum possible extent by using adequate and intuitive tools and by providing clear definitions of the RSDI indicators, which when available are pre-filled with values from literature (incl. mentioning of source). The chosen web survey tool is EUSurvey, a free of charge service provided by the European Commission and

The specific objectives of the ESG are: To evaluate the outcomes of the Agency's work programme, to assess the link between Agency outcomes and Sector impacts, ensure continuous improvement of Agency Impact Assessments in terms of clarity, conciseness and coherence.

PRO_ESG_001 V 1.0

extensively used by ERA for its own surveys. EUSurvey is provided on the basis of clear terms of service and it is GDPR-compliant through its privacy statement;

2. The **data collection and analysis of the survey results shall be performed only by ERA statutory staff of the Analysis Team who are also the only authorised administrators of the EUSurvey tool** setup for this initiative. No other person or entity (neither a sector organisation or a European Institution or Body) has access to the EUSurvey nor the raw survey results. Although the processing of personal data during surveys should be limited, ERA follows its own privacy notice for consultations in line with Regulation (EU) 2018/1725;
3. The EU Survey data in cloud shall be deleted within 3 months following the closing date of the survey. Only the EUSurvey output files (listing all responses) shall be kept on ERA's IT system for data analysis purposes within a protected environment, only accessible to ERA Analysis Team members;
4. As some of the data to be collected refer to costs and prices of assets and operations, the survey respondents may choose to remain anonymous if their organisation belongs to a representative body.
5. Participation to the survey is not mandatory and respondents may provide data for only some of the RSDI indicators;
6. ERA shall provide EUSurvey password-protected weblinks to each representative body. Each survey has the same content. The representative bodies are responsible to promote and disseminate the weblinks to their members via email and to provide to ERA, to the extent possible, the number and type of their member organisations. This will allow ERA to perform a generic monitoring of the response rate to the surveys;
7. For some selected rail stakeholders not member of a representative body, ERA may dispatch the same EUSurvey password-protected weblink via email. For these respondents, the survey cannot be anonymous and the responding organisation will have to identify itself. This is required for non-RB affiliated organisations to guarantee that the survey is not being used maliciously by unknown parties;
8. ERA shall perform the data analysis of the surveys' results and propose to the ESG TF values for each RSDI indicator in scope of the survey provided that meaningful feedback has been received. The values may be aggregated unit values, ranges or averages not statistically significant but rather indicative. The ESG TF shall provide a validation of the proposed values during dedicated meetings whereby appropriateness, robustness and representativeness of the values is discussed. No company specific values and other confidential information shall be disclosed before / during / after the meeting. The validation process takes place under Chatham House rule[4] as only the final decision on the proposed RSDI values is recorded in the meeting minutes;
9. In principle, as per the terms of reference of the ESG TF, the selected final RSDI values shall be published on the ERA website with a specific disclaimer drafted by the ESG TF highlighting the methodological limitations and the indicative nature of the RSDI output. However, if the values of certain indicators are deemed to be sensitive by the ESG TF, a subset of the final RSDI indicators may instead be published on a separate ERA Extranet space with restricted access for ERA statutory staff.

[4] The validation process takes place in meetings where the nominated experts part of the ESG TF express their opinion on the values proposed by ERA for each RSDI indicator as a result of the survey. The individual advice provided by each TF is not recorded in the meeting minutes and it is not disseminated outside of the meeting. This ensures that each TF member is free to give its advice on the representativeness, plausibility and correctness of each proposed value for the RSDI indicators without disclosing data or information sourced from his company or organisation.

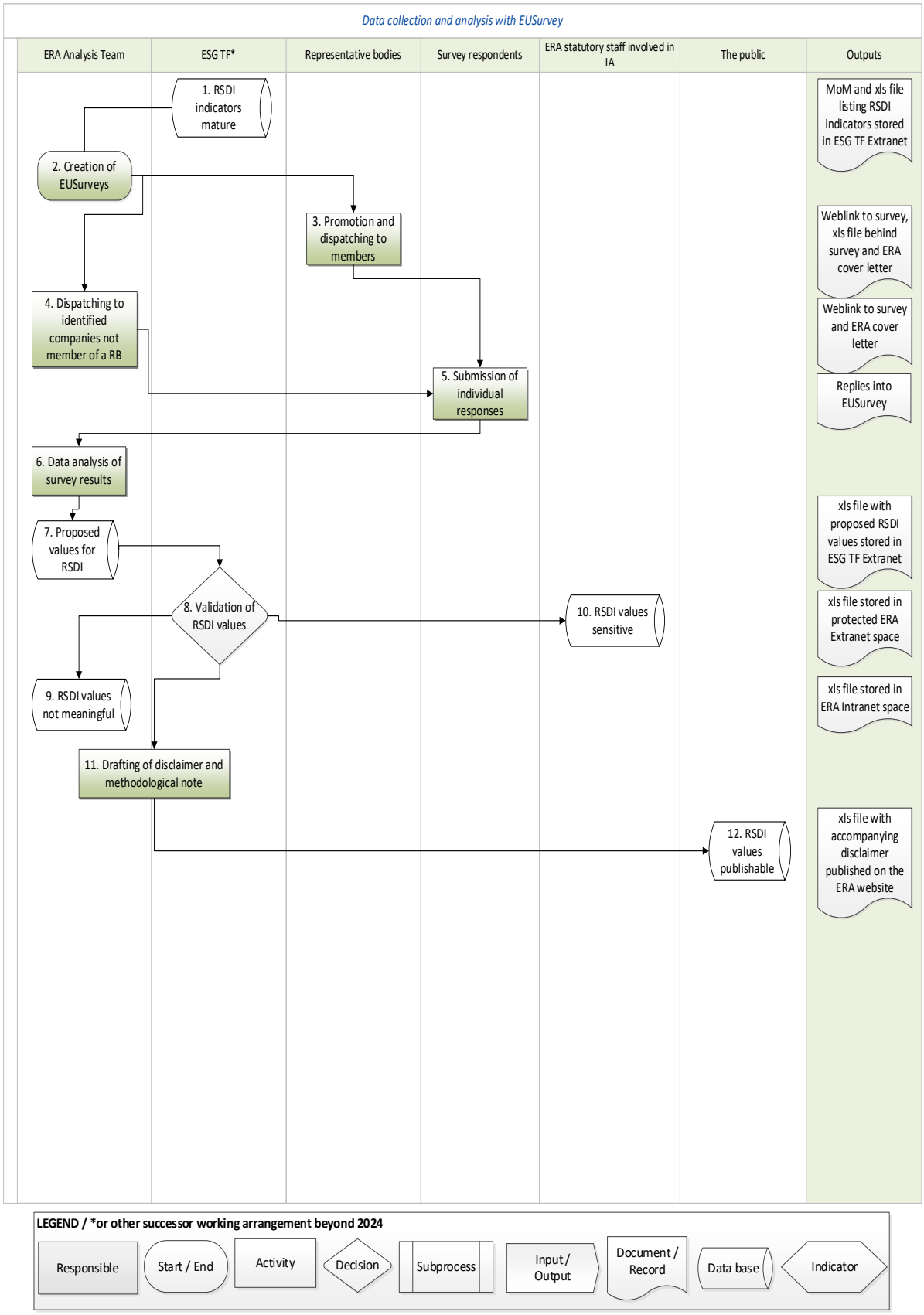
PRO_ESG_001 V 1.0

This process of data collection and analyses within the ESG TF on Standard inputs for economic analyses is based on the following assumptions:

1. All parties involved work in a cooperative spirit to develop RSDI indicators which are as meaningful as possible. All parties agree that this joint effort of data collection does not aim for statistical significance as the values validated for the RSDI are indicative unit values or ranges;
2. Through the information shared by the representative bodies, one person will be tasked to reply to the surveys on behalf of one organisation thus avoiding multiple respondents from the same entity;
3. The representative bodies cooperate with ERA for a successful dissemination of the surveys across their members by providing appropriate advertisement and internal awareness ahead and during the survey process;
4. Each survey respondent provides data based on its own internal records, experience or experts' advice. The data are submitted into EUSurvey independently from instructions of other organisations thus avoiding an artificial skewness of the survey results.

PRO_ESG_001 V 1.0

5. Flowchart



PRO_ESG_001 V 1.0

6. Process description

6.1. Step 1. RSDI indicators mature

The ESG TF reviews the RSDI indicators, the values available from literature (incl. mentioning of source), the metric to be used to quantify values, the definitions and the information on the scope of each indicator. A shortlist of indicators is deemed as mature, meaning survey respondents would understand what data to be considered for validation and/or to be provided.

6.2. Step 2. Creation of EUSurveys

The ERA Analysis Team creates password-protected web surveys using admin rights of the EUSurvey tool and shares them with the representative bodies together with an ERA cover letter. An intro page informs respondents of the key principles for the handling of the survey.

6.3. Step 3. Promotion and dispatching to members

The secretariat of each representative body promotes within its membership this initiative of data collection ahead of the start date of the survey. The secretariat emails the web survey link and the ERA cover letter to the nominated representatives of each of its members highlighting the importance of having one survey respondent per organisation.

6.4. Step 4. Dispatching to identified companies not member of a representative body

The ERA Analysis Team emails the web survey link and the ERA cover letter some identified companies not member of a representative body (e.g. several rail equipment suppliers) highlighting the importance of having one survey respondent per organisation. These surveys are identical to those in Step 3 except that the identification of respondents is mandatory.

6.5. Step 5. Submission of individual responses

Each survey respondent provides data to all or some of the RSDI indicators in scope. The survey is open from/to a given date.

6.6. Step 6. Data analysis of survey results

The ERA Analysis Team with EUSurvey admin rights analyses the survey results and develops a list of proposed values for each of the RSDI indicators.

6.7. Step 8. Validation of RSDI values

The ESG TF reviews during meetings the proposed values for each of the RSDI indicators assessing appropriateness, robustness, representativeness and possible business sensitivity of each value.

6.7.1. Step. 9 RSDI values not meaningful

The ERA Analysis Team stores the list of RSDI values deemed as not meaningful in a protected internal repository.

6.7.2. Step 10. RSDI values sensitive

The ERA Analysis Team stores the list of RSDI values deemed as business sensitive in a protected Extranet space accessible to ERA statutory staff involved in impact assessments and other economic analyses.

6.8. Step 11. Drafting of disclaimer and methodological note

The ESG TF, on the basis of a proposal from the ERA Analysis Team, drafts a disclaimer and a methodological note that shall accompany the selected RSDI values to be published on the ERA website.

PRO_ESG_001 V 1.0

6.9. Step 12. RSDI values publishable

The list of selected RSDI values is published by ERA on its website together with the disclaimer and the methodological note. The list is available for use by the public (e.g. economic analysts) and can be quoted.

7. Records and Other Outputs

Record Name	*Storage Responsible*	*Storage Location*	*Maximum Retention Time*
› EUSurvey data submitted by respondents	ERA Analysis Team	EUSurvey space	3 months as of survey closing date

Record Name	*Storage Responsible*	*Storage Location*	*Minimum Retention Time*[5]
› EUSurvey output file for RSDI data analysis	ERA Analysis Team	ERA Intranet	1 year
› RSDI not meaningful indicators	ERA Analysis Team	ERA Intranet	4 years
› RSDI business sensitive	ERA Analysis Team	ERA Extranet protected	4 years
› RSDI publishable	ERA Communication team	ERA website	4 years

Other Outputs Name	*Storage Responsible*	*Storage Location*	*Minimum Retention Time*
ESG TF MoM	As stated in the related IMCS[6] documents applicable to all ERA Units		
Disclaimer and methodological note for the RSDI publishable	ERA Communication team	ERA website	4 years

[5] Maximum retention time are not set and may be decided later by the ESG TF.
[6] The Internal Management Control System is the quality management system in use at ERA as per Decision of the Management Board.