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Original

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Environmental specifications for new rolling stock

Spécifications environnementales pour le matériel roulant neuf
Umweltspezifikationen für neue Schienenfahrzeuge



UNION INTERNATIONALE DES CHEMINS DE FER
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Summary

The Leaflet addresses all relevant aspects for the integration of environmental aspects into the procurement process: from invitations to tender to evaluating tenders with regard to their environmental performance. The leaflet is derived from the UIC project PROSPER ("Procedures for Rolling Stock Procurement with Environmental Requirements").

It is the aim of this leaflet to contribute to harmonisation of the environmental procurement framework in the rail sector at European, and in the long-term global level. By doing so the process of procurement is to become more efficient, enabling new rolling stock with a sound environmental performance to be procured more cost effectively.

1 - Introduction

UIC Leaflet 345 addresses all relevant aspects for the integration of environmental aspects into the procurement process. It is designed to enhance the procurement of rolling stock for both setting up invitations to tender and evaluating tenders with regard to their environmental performance. The leaflet is derived from the UIC project PROSPER (see Bibliography - page 56).

It is the aim of this leaflet to contribute to harmonisation of the environmental procurement framework in the rail sector at European, and in the long-term global level. By doing so the process of procurement is to become more efficient, enabling new rolling stock with a sound environmental performance to be procured more cost effectively.

Please note that this leaflet is designed as a guidebook and it is thus not possible to demand compliance "clause by clause". Instead the content of this leaflet will have to be adapted to suit the existing procurement procedures and the economic needs and environmental priorities of each operator. The status of this leaflet is "recommended".

1.1 - Structure of the leaflet

In point 1 the scope and overall aim of the leaflet is outlined. In point 2 - page 7 the legal framework for procurement is sketched. The core of the leaflet is point 3.4 - page 19 in which detailed descriptions of environmental performance specifications are given. In point 3.1 - page 12 an outline is given showing how environmental performance can be incorporated into the procurement process. Point 3.5 - page 35 outlines how the tender evaluation process can be structured. Background information on the key environmental areas covered is given in appendix. A list of abbreviations can be found on page 54.

A background paper accompanying this leaflet entitled "*Legal Aspects of Eco-Procurement*" (see Bibliography - page 56) was developed within the PROSPER project. It specifies the legal framework in greater detail and gives additional information on the issues covered in this leaflet.

1.2 - Scope and approach

This leaflet is intended to provide assistance for the procurement of new rolling stock for passenger as well as freight transport (multiple units, locomotives, wagons and coaches). It addresses all the relevant areas in the context of integrating environmental aspects into the procurement process. The leaflet adopts a functional approach using performance-related and not solution-related environmental specifications.

In general, a life-cycle perspective is favourable when assessing environmental impact. In this respect the recommendations given in this leaflet aim at improving environmental performance focussing on the most crucial issues within the whole life-cycle. In many cases the long life span of rail vehicles shifts the use phase into the centre of attention. On the other hand, operators are best equipped to improve performance during use at the procurement stage.

The following key questions in the process of procurement of rolling stock are addressed:

What are the key environmental areas to be addressed in invitations to tender?

The key areas of energy consumption, noise emissions, exhaust emissions and materials/recycling/waste are considered. Furthermore, other miscellaneous issues such as the forthcoming environmental aspect of electromagnetic fields, have been included in the leaflet in line with the precautionary principle¹.

How should the procurement process be organised to enhance the environmental performance of new rolling stock?

As the procurement of new rolling stock is influenced by a large number of different actors inside and outside the railways, it is crucial to have a clear view of the process steps needed and the categories of experts that must be involved in procurement of rolling stock and the role they must play in order to achieve a clearly defined environmental performance.

Which environmental specifications should be used in invitations to tender?

The focus of this leaflet is to harmonise a set of qualitative environmental specifications that cover the key aspects governing the environmental performance of railway operations. In this leaflet target values are given for those specifications for which they could be derived from the applicable legislation. For all other quantifiable and measurable specifications no values are defined. Instead, operators should set requirements for performance values in order to assess the environmental performance of new rolling stock under specific conditions and at the same time improve the information bases for the respective specification.

In this respect it has to be pointed out that this leaflet is to be considered a first step towards a list of harmonised environmental standards in rail procurement. The specifications which can be handled (and verified!) at present are listed. Further harmonisation requirements and ongoing efforts are pointed out in the respective sections.

What approach should be used to evaluate tenders?

An approach to the evaluation of tenders should integrate assessment of the environmental as well as the economic performance with respect to Life-Cycle-Costs (LCC). A five-phase model for the evaluation process is proposed.

1.3 - Target audience for this leaflet

This leaflet is aimed at users within the rail business who are involved in the procurement of new rolling stock, but who are not directly concerned with environmental aspects. Technical and purchasing experts in particular are therefore identified as the main user groups, but environmental experts will also find valuable information here. The leaflet will help the user to:

- prioritise environmental aspects for rail vehicles,
- integrate environmental specifications in invitations to tender in a consistent manner and
- evaluate tenders in terms of meeting environmental requirements.

Although the leaflet is primarily geared towards assisting operators, it is also intended to be useful for engineering and purchasing staff of manufacturers in the supply chain (system integrators, system manufacturers, sub-suppliers, etc.).

1. For a definition of the precautionary principle, see the European Commission's Communication COM (2000) 1.

1.4 - Key environmental areas for railways

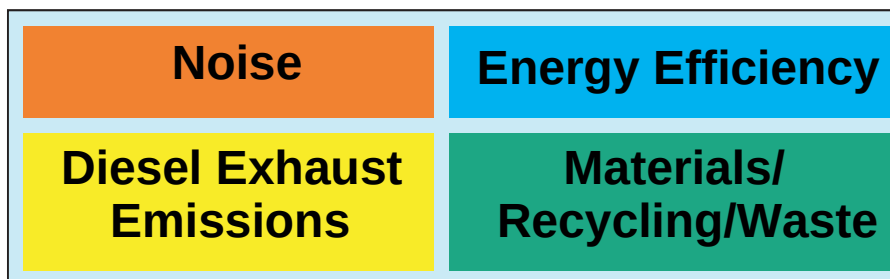


Fig. 1 - Key environmental areas

The most relevant environmental areas for railways at the moment are noise, diesel exhaust emissions and energy efficiency.

Noise and **Diesel Exhaust Emissions** are highly relevant for railways because of increasing public pressure in these areas leading to stricter legislation which partly is in force already (Environmental Noise Directive, TSI for High-speed noise, and Non-Road Mobile Machinery Directive) or will enter into force in the near future (TSI Noise for conventional rail). Further steps or stricter emission limit values are foreseen in these two environmental fields by the legislator.

As far as **Energy Efficiency** is concerned, railway transport has very clear advantages compared to other modes of transport. However, competitors are putting a lot of work into reducing their energy consumption. In view of this, energy efficiency is of high priority for the railways because cutting energy consumption:

- helps to maintain/strengthen the competitive position of railways compared with other modes of transport
- helps to cut the Life-Cycle-Costs of railway operation and
- is in line with international agreements on climate protection, such as the Kyoto Protocol.

Materials/Recycling and Waste is subject to extensive international legislation. It has increasingly become a priority for the rail sector over the last decade due also to customer requirements. Since the concept of an Integrated Product Policy (IPP) is becoming more and more relevant in the EU, resource consumption and the ability to reintegrate materials into the material cycle are high on the agenda. For the industry as well as railways this represents the need for environmentally sound selection of materials and technology, improving knowledge of restricted materials used in vehicles to avoid hazardous waste, occupational health impact during manufacture and maintenance and improving vehicle recyclability, thereby cutting resource consumption. Although not generally applicable to rail products, the *EU directives WEEE and RoHS* (see [List of abbreviations - page 54](#)) set the scene and lay down a strategy from a regulatory point of view.

1.5 - Economic effects

The complex interaction between environmental and economic performance of rolling stock is of vital importance for the railways. The economic effects of specific measures to improve environmental performance depend primarily on the framework conditions of the relevant key area (legislation, regulations, policy, standards etc.) as well as the technologies used (technological potential, degree of innovation, maturity, availability, market size) and cover a wide range from being highly cost reducing to highly cost intensive.

In order to guarantee the competitive advantages of railways in comparison to other modes of transport, improvement of environmental performance in non-regulated areas must be brought about in a highly cost efficient way. To identify the best solutions a detailed assessment of the environmental and economic effects of the applicable technological options must be carried out.

A qualitative evaluation of the impact of improving environmental performance showed in many cases an increase in investment costs. A thorough analysis of economic effects should not focus on initial investment costs only but be based on a LCC perspective and take into account future developments in the legal, political and technological framework conditions.

- Improving energy efficiency is believed to have clear benefits in terms of LCCs. As energy efficiency is also one of the outstanding environmental aspects for railways, very high priority is accorded to the associated specifications.
- Achieving noise and exhaust emission levels lower than the legally mandatory levels can lead to increasing LCC, at least under the current legislation and using the technologies available. Limiting electromagnetic fields in accordance with current recommendations is believed to have no significant influence on operating costs but to slightly increase investment costs.
- Ambivalent effects on LCC have been noted for improving the environmental performance in the materials/ recycling/ waste area. There often appears to be a compromise between higher investment costs and lower end-of-life and sometimes also maintenance costs. End-of-life costs of rolling stock are quite difficult to assess. The technical standard for dismantling and recycling facilities, as well as the respective legislation, is very difficult to estimate over a thirty year time frame. However, the high costs of asbestos or PCB disposal for example demonstrate the need for a thorough LCC analysis.

1.6 - Opportunities and risks

Sound strategic management should always take into account environmental risks and opportunities as well as the investment perspective (short, medium and/ or long term). This is especially true for the long life-span of rail vehicles, which calls for a long-term risk/ opportunity perspective in the procurement of these vehicles. Changing framework conditions (e.g.: operating conditions, relationships with competitors, legislation, customer requirements) could impose risks but could also create opportunities for railway operators. In line with the overall trend in society, the demand for environmental performance is increasing - a fact which also holds true for the rail sector.

Despite the uncertainties associated with long-term assessments generally, it is a necessity from a prudent business perspective to take such long-term assessments into account and make every effort to minimise future risks. Taking environmental aspects into account in such assessments may not only outweigh investment costs (e.g. by avoiding high retrofitting costs in the life span of vehicles), but may also create advantages towards other modes of transport.

Minimising operational costs

Sound environmental performance in many fields contributes to minimisation of operational costs. Some issues can quite easily be addressed in LCC assessments (see point 1.5 - page 5). Most prominent is energy consumption. In view of the mid and long-term increase in energy supply prices, energy efficient vehicles will become a business prerequisite. Furthermore, there are various other minor issues which could contribute to reducing operational costs (for example, reducing the wear of braking material reduces emissions and contributes to lower maintenance costs).

Reducing business risks

A change in the legal framework in particular could pose severe business risks for railways. Readjustments (modernisation and upgrading) during the life-cycle of rolling stock are normally very costly especially if the respective technical solutions have not been integrated into the design of the vehicle. European and national legislation does not normally focus on the existing fleet but rather on new vehicles and consequently does not cause restrictions in operation in most cases.

However, some very general legislation (such as the EU directive on ambient air quality) may trigger action at national or regional level which could restrict the operability of rolling stock with low environmental performance. In addition, local authorities could demand specific environmental performance in tenders for service contracts. High environmental performance in new rolling stock thus increases the proportion of an operator's fleet able to fulfil a greater variety of demands.

Strategies for the rail sector

Optimising the environmental performance of rail vehicles in a pro-active way can create opportunities for the whole rail sector. With a view to other modes of transport (road and air), it is important to maintain and extend the environmental advantage of rail transport in order to gain the strong support from politics and the public which is needed to be a successful mode of transport in the future. If the rail sector adopts the strategy of complying with legal requirements only, the reputation of the railways could be damaged and a loss of opportunities in intra-modal, as well as in inter-modal, competition could result.

By further developing environmental standards for the rail sector, risks can be minimised and business opportunities enhanced via improved environmental performance with minimised LCCs.

2 - Legal framework of procurement

2.1 - Key environmental legislation

The following tables give an overview of international, EU and national legislation concerning the four environmental key areas of noise, diesel exhaust emissions, energy efficiency and materials/recycling/waste, as well as miscellaneous other issues. The focus of this overview is on legislation which is applicable in Europe. The current status and future trend of legislation and other regulations are covered.

Detailed information on the legal framework of each key area can be found in the background document "*Legal Aspects of Eco-Procurement*" (see [Bibliography - page 56](#)).

Noise

Legislation	Other regulations	Trend
Harmonisation at EU-level - TSI Noise for HST (<i>EU Directive 2002/735/EC</i>) and conventional railways (<i>EU Directive 2001/16/EC</i>)	- EU green and white papers	- No trend limit values - Noise-level related route pricing (e.g. Switzerland, the Netherlands) - TSI revision process

Diesel exhaust emissions

Legislation	Other regulations	Trend
Harmonisation at EU level - <i>EU Directive 97/68/EC</i> on non-road mobile machinery is extended to railway applications by its <i>Amendment 2004/26/EC</i>	- <i>UIC Leaflets 623/624</i> "Exhaust emission tests for diesel traction engines" - EU Directive on ambient air quality	- Decreasing limit values - Stage IIIA (2005-2009 of EU Directive) - Stage IIIB (from 2011 on) subject to revision in 2007

Energy Efficiency

Legislation	Other regulations	Trend
No harmonisation at EU level	- International agreements on climate protection (e.g. Kyoto Protocol) - Indirect measures and incentives: taxes, emission trading	- EU draft directive on energy end-use efficiency and energy services (COM (2003) 739)) - EU directive on eco-design requirements for energy-using products (EuP, not valid for vehicles) - 2008-2012: 8 %-9 % EU average reduction for CO₂ emissions

Materials, recycling and waste

Legislation	Other regulations	Trend
Harmonisation at EU level EU directives on: - Classification of dangerous substances (<i>EU Directive 67/548/EEC</i> and its amendments) as well as corresponding <i>Commission Regulation EC No 1488/94</i> on risk assessment of existing and <i>Commission Directive 93/67/EEC</i> on risk assessment of notified substances - Marketing and use of certain dangerous substances (<i>EU Directive 76/769/EEC</i> and its amendments) - Dangerous preparations (<i>EU Directive 1999/45/EC</i> and its amendments) - European waste catalogue (<i>EWC - EU Commission Decision 2000/532/EC</i>) - EU battery legislation, <i>Directive 91/157/EEC</i>	- Restricted materials and recycling/recovery rates for electric/electronic equipment (<i>EU Directive 2002/96/EC - WEEE</i>) - (<i>EU Directive 2002/95/EC RoHS</i>) - Restricted materials and recycling/recovery rates for end-of life vehicles (<i>EU Directive 2000/53/EC - ELV</i>; not valid for rolling stock) - <i>Montreal Protocol</i> on substances that deplete the ozone layer - <i>OSPAR Convention</i> for the Protection of the Marine Environment of the North-East Atlantic - <i>Stockholm Convention</i> on persistent organic pollutants (POPs, see List of abbreviations - page 54)	- REACH process (see List of abbreviations - page 54) - More substances will be included - Reduction of target values for harmful substances

Other

Legislation	Other regulations	Trend
EMF - <i>EU Directive 2004/40/EC</i> on exposure of workers to EMF - Stringent national legislation (Switzerland, Italy, Finland stricter than ICNIRP (see List of abbreviations - page 54)	- <i>European Council Recommendation 1999/519/EC</i> on the limitation of exposure of the general public to electromagnetic fields (stricter than <i>EU Directive 2004/40/EC</i>) - Generally accepted recommendations (ICNIRP values) - National recommendations	- Harmonisation efforts on EU level - Low precautionary limits - No trend limit values

2.2 - Legal framework for the integration of environmental aspects with respect to EU public procurement

Essentials

EU legislation for procurement in the transport sector explicitly permits and encourages the integration of environmental issues in the award procedure. The so-called "Utilities Directive" covers all state as well as non-state enterprises operating in the field of transportation which act based on special or exclusive rights (e.g. awarding authorities, operators, leasing companies, etc.).

Scope of the utilities Directive

The scope of the procurement process, guided by *Council Directive 93/38/EEC* ("Utilities Directive") and the corresponding Commission Regulation (EC) No 1874/2004 of 28 October 2004 (see [Bibliography - page 56](#)), also include non-state enterprises operating in the field of transport procurement, which act based on special or exclusive rights where supply or service contracts exceeding a (net) order value of € 473 000 - or construction orders exceeding € 5 923 000 - are awarded. Thus the procurement of new rolling stock for railways must in most cases comply with the "Utilities Directive".

Modifications by the "new" consolidated regulations for awarding contracts

By 31 January 2006 at the latest the EU Member States have to implement the new "*Utilities Directive*" 2004/17/EC (see [Bibliography - page 56](#)). From an environmental point of view, the most significant change compared to the previous version is the explicit statement that the integration of environmental issues into the award procedure is now permissible and desired. Furthermore, it clarifies that the production process may be taken into consideration for the awarding procedure.

Essentials of the awarding procedure

The contracting authority is basically free to determine the requested scope of performance. It has procurement autonomy which is subject only to the prohibition of direct and indirect discrimination.

In essence, a comprehensible description of performance is required, which is guided by European standards and specifications. Selection of the appropriate tenderer (according to the qualification criteria) must be separated from the evaluation of the offers (according to the awarding criteria). The awarding party determines the decisive criteria for the evaluation of the tender. The central principles of the awarding regulations regarding disclosure, transparency, objectivity and equal treatment must be respected.

Besides the qualification criteria and the awarding criteria, additional criteria may be taken into consideration when taking the awarding decision. These additional criteria must not be contrary to the exclusion and qualification criteria standardised in the "Utilities Directive", must not discriminate between participants and must respect further prohibitions and orders of the EU treaty; they have to be announced in parallel to the other contract conditions, must be verifiable in an objective manner and must not leave the awarding party unrestricted freedom of choice.

2.3 - Integrated product policy (IPP)

All products cause environmental degradation in some way, whether as a result of manufacturing, use or disposal. Integrated Product Policy (IPP) as proposed by the EU seeks to minimise these by looking at all phases of a products' life-cycle and taking action where it is most effective and utilising input from all relevant stakeholders.

The life-cycle of a product is often long and complicated. It covers all the areas from the extraction of natural resources, through design, manufacture, assembly, marketing, distribution, sale and use to eventual disposal as waste. At the same time it also involves many different actors such as designers, industry, marketing experts, retailers and consumers. IPP attempts to stimulate each part of these individual phases to improve their environmental performance.

With so many different products and actors involved, there cannot be one simple policy measure for everything. Instead a whole variety of tools - both voluntary and mandatory - will be used by EU to achieve this objective. These include measures such as economic instruments, substance bans, voluntary agreements, environmental labelling and product design guidelines.

This leaflet supports the EU's IPP approach by defining environmental requirements specifically for rolling stock. Thus the environmental impact of rolling stock in the life cycle will be reduced efficiently.

For further information, please visit the EU Commission's web pages on Integrated Product Policy: <http://ec.europa.eu/environment/ipp/home.htm>.

3 - Environmental specifications in invitations to tender

3.1 - Considering environmental aspects in the procurement process

The procurement process for new rolling stock is characterised by a range of different requirements to be fulfilled and a large number of actors involved. For efficient integration of environmental requirements into the railway procurement process, it is important to clarify and define the roles of the different players in the process and be aware of the interfaces involved and information required at the various process stages.

For example, the question of who sets the requirements for the environmental performance of rolling stock is not always easy to answer and differs from country to country and company to company. In addition to legal requirements and requirements voluntarily set by the railway operator, additional requirements may be set by infrastructure operators or national authorities which put transport services out to tender such as regional rail transport. These additional requirements must also be taken into account in the procurement process.

Fig 2 - page 13 proposes a generic procedure for the procurement process (highly simplified) and proposes a method for integrating environmental aspects into the procurement process, based on this leaflet.

The subsequent explanations provide definitions of the interfaces to the environmental aspects and of the tasks that have to be performed to integrate environmental aspects, as well as a description of the input needed to carry out these tasks.

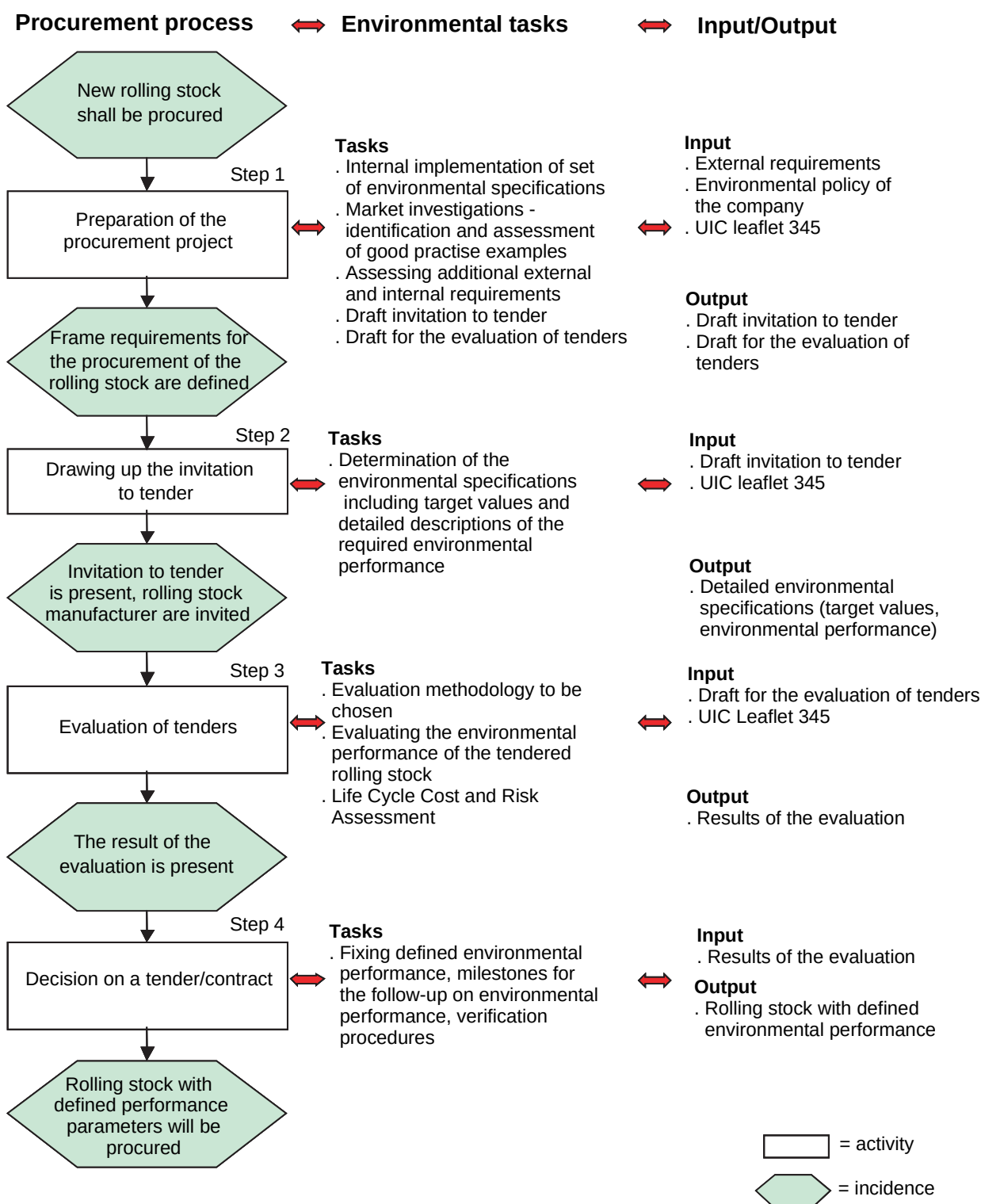


Fig. 2 - Procedure for the integration of environmental aspects into the railway procurement process

3.1.1 - Step 1: Preparation of the procurement project

The preparation of the tendering phase in terms of environmental requirements is a fundamental step towards integrating environmental aspects into the procurement process. Prior to drafting a tender, the operator should perform market investigations to identify the technological state of the art and analyse examples of good practise which could serve as benchmarks.

At this phase, the harmonised set of environmental specifications as defined in this leaflet should be used as a basis for drawing up the invitation to tender (and later for the evaluation of tenders). This first approach should be completed by including additional internal and external requirements resulting from specific national legislation, a particular focus of the operator's environmental strategy, etc. Furthermore, it helps to clearly define responsibilities and interfaces.

Harmonised set of Environmental specifications

The internal implementation of *UIC Leaflet 345* provides the basic set of harmonised environmental specifications to be integrated into the draft invitation to tender.

Involved: Environmental and technical experts
 Input: *UIC Leaflet 345*
 Output: Internal set of basic environmental specifications.

Additional external and internal requirements

In the next step the railway should assess additional external and internal requirements for the environmental performance of the kind of rolling stock to be procured not yet or not sufficiently covered by the UIC leaflet. Examples are:

- Specific national or regional legislation and regulations
- Specific requirements from national and/or local authorities or infrastructure operator (if applicable)
- Requirements from other stakeholders (e.g. customers, NGOs, general public).

Involved: Environmental and technical experts
 Input: External requirements, Environmental policy of the company, *UIC Leaflet 345*
 Output: Overview of additional external environmental requirements.

Draft invitation to tender

Involved: Technical, environmental and purchasing experts
 Input: *UIC Leaflet 345*, outcome of the assessment of external and internal requirements
 Output: Customised set of environmental specifications for the invitation to tender.

Draft for the evaluation of tenders

- Involved: Technical, environmental and purchasing experts
- Input: *UIC Leaflet 345*, outcome of assessment of external and internal requirements (priorities)
- Output: Draft document for the evaluation of tenders.
- Procedure for the evaluation of tenders
 - Procedure for the impact on the decision in favour of a certain tender and implementation of environmental performance criteria in the contract
 - Responsibilities for evaluating the environmental performance of the tendered rolling stock.

3.1.2 - Step 2: Drawing up the invitation to tender

The invitation to tender has to be drawn up in detail taking into account the above-mentioned draft document. Consequently the environmental specifications from the draft document have to be substantiated and adapted to suit the particular procurement project.

- Involved: Technical, environmental and purchasing experts
- Input: *UIC Leaflet 345*
- Output: Invitation to tender with detailed environmental specifications including target values and detailed descriptions of the required environmental performance.

3.1.3 - Step 3: Evaluation of tenders

- Involved: Technical, environmental and purchasing experts
- Input: *UIC Leaflet 345*, especially the evaluation strategy laid out in point [3.5 - page 35](#)
- Output: Results of the evaluation of environmental performance.

For the evaluation of tenders the proposed evaluation methodology has to be suited to the procurement project. This can be done by assigning priorities according to the results of the assessment described in step 1 (see point [3.1.1 - page 14](#)) and by taking into account the impact on initial investment and Life-Cycle-Costs.

The evaluation should be carried out in close cooperation between the technical, environmental and purchasing departments. The result of the environmental evaluation should be documented and be part of the decision in favour of a certain tender.

3.1.4 - Step 4: Decision on a tender/contract

- Involved: Purchasing, technical and environmental experts
- Input: Results of the evaluation of the tenders
- Output: Rolling stock with defined environmental performance.

In negotiations with the manufacturer, the defined environmental performance of the rolling stock proposed is to be laid down in the contract. In addition, milestones for the follow-up on environmental performance, as well as for verification procedures, must be agreed upon.

3.2 - Types of specifications

Environmental specifications are used to assess the environmental performance of new rolling stock. In order to guarantee maximum transparency and comparability as well as a high level of acceptance, the applied set of specifications has undergone a harmonisation process within the rail sector.

A framework has been developed to structure the environmental specifications to be used in the tendering process (see table 1 - page 17). It differentiates between mandatory and voluntary specifications and divides them into two groups (environmental performance mainly dependent on design or dependent on operation). Target values for the mandatory specifications are defined by legislation/regulations and therefore must be met by any tenderer. However, compliance with the applicable legislation is only the minimum requirement and in general a better environmental performance will yield better evaluation results from the environmental point of view.

The following general strategic orientations can be attributed to the different types of specifications:

- **Legally Mandatory Specifications**

For the specifications in the first row, the environmental performances are legally regulated. A potential better performance than the legal baseline could represent a more sound long-term investment in rolling stock because it reduces the risk of future expenses and efforts to meet higher environmental legal standards.

- **Voluntary specifications**

The second row contains specifications which are not governed by legislation. These specifications can be used in invitations to tender according to the environmental strategy of the company, national requirements and priorities as well as economic assessments.

- **Performance mainly dependent on design**

The first column comprises specifications which have a direct influence on the environmental performance of rolling stock basically independent of the operation of the rolling stock. As examples the rate of renewable materials and the specific mass are fixed by construction and do not change during the lifetime of the vehicle unless design changes are made to the vehicle.

NB : It must be recognised that for most specifications in this category, environmental performance is not fully defined by design only. Operational patterns may retain a small amount of influence e.g. the rate of leakages can increase due to insufficient maintenance.

- **Performance mainly dependent on operation**

The environmental performance with respect to issues addressed in the second column depends to a high degree on how the new rolling stock is actually used in operation. The design is certainly a precondition to obtaining a good performance. But whether or not it is reached in practice depends to a large extent on operational patterns and the infrastructure on which the rolling stock is used. Energy meters for example will not yield any reduction in energy consumption by themselves, but are a prerequisite for energy efficient driving campaigns with which energy consumption can be reduced dramatically.