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**ECORails –
Energy efficiency and environmental criteria in the awarding of regional rail transport vehicles and services**



**Deliverable 15:
Validation Strategy including
Validation Exercise Plan**

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Introduction

This document presents the analysis, evaluation and validation strategy of the ECORailS project, and after its approval, will become a working instrument for WP5, and also for the other activities and deliverables which will be elaborated within the project. On the basis of the evaluation, WP5 will provide an outline of recommendations for the implementation of the Guidelines and suggestions for its further development.

The validation strategy and the exercise concept – D 15, achieved within WP5 is aimed to define the instruments and the modality in which, by using scientific well grounded means and by taking a step-by-step user-oriented action, to make sure that all the foreseen objectives were reached and the ECORailS project is really useful and efficient for the users.

The validation process covers the whole period of project progress and stands for the modality in which Work Package 5 – “Evaluation and Validation” assumes the role of ECORailS “Watchdog”, analyzing project works through the beneficiary’s (the user’s) eyes.

Following the evaluation and validation process, WP5 aims at providing a set of conclusions and recommendations in order to put into application a highly performing Guidelines, useful as a decision support for the decision makers in PTAs, TOCs, IMs – for an energetically ecological and efficient awarding process for rolling stock and regional railway transport services.

The basic documents on which the strategy is built:

- Annex 1 to Contract IEE/08/690/SI2.528422 – Description of the Action
- Minutes of WP2-WP3 kick-off meeting in Berlin, 27.05.2009
- Minutes of WP5 kick-off meeting in Bucharest, 24.07.2009
- Minutes of 1st Editorial group meeting in Stockholm, 24-26.08.2009
- Presentations at the 1st User Platform meeting in Berlin, 10-11.09.2009
- Minutes of WP2-WP3 meeting in Rome, 16-18.09.2009
- Minutes of WP2-WP3 meeting in Copenhagen, 05-06.10.2009
- Other documentations, according to Bibliography - Annex 3

The role of WP5 (“Evaluation and Validation”) in the project

WP5 participates in the project activities WP2, WP3, WP4 and WP6, collects material from these WPs to make the necessary proposals from the validation perspective, as well as to create the data basis and the know-how underlying the validation strategy elaboration.

Based on qualitative criteria for assessing the Guidelines performance (enhancement of environmental awarding, integration into the awarding process), the indicators and the set of criteria have to be applied according to the implementation of the Guidelines in other European regions alongside suggestions on the further development of the Guidelines including future promotion strategies.

Internal Work Cycle of the document (elaboration – partner feedback - completion)

With a view to pursuing the accomplishment of project objectives and of internal correlation, all the proposals and deliverables from the other WPs are going to be analyzed from the perspective of WP5, afterwards providing possible completions or suggestions.

There has been and still exists a continuous and efficient dialogue between WP5 and the other WPs so that all materials will be elaborated according to the general and specific project objectives (the three levels of indicators), in parallel with the permanent adaptation according to the User Platform feedback.

Based on the results obtained during the tests from WP4 – in the 4 locations, WP5 will elaborate a synthesis of recommendations for the implementation of the instructions and suggestions for further development.

Own evaluation/validation instruments used in WP5

- Quantitative and qualitative analysis

Calculations of the effects of the new indicators/ technologies used in the new awarding procedures will be used mainly to determine the energy savings and environmental effects in order to verify the achievement of the first level performance indicators.

- Comparisons

Comparisons will serve as an important tool which will be used in the evaluation of the test results in the four areas. Qualitative and quantitative comparisons will serve to identify common elements within the test areas and correlate these with similar results in order to draw relationship lines between regional specific/ common elements and test results

- Questionnaires

Questionnaires will be used to determine the manageability performance of the Guidelines as well as to determine whether the dissemination objectives have been met. By employing a set of questions that will be answered by the PTAs involved in the tests and other stakeholders, WP5 will be able to grade the manageability of the Guidelines according to a scale.

- Interviews

Interviews will be used to determine the manageability performance of the Guidelines. Interviews in WP5 will be modified questionnaires to adapt to the time frame of the interview.

- Alternative scenarios

The alternative scenarios are used to enhance the information obtained through the specific evaluation/ validation instruments. The scenarios will be built on the existing information and adjusted as soon as further info becomes available. Scenarios may be constructed as soon as the evaluation activities begin and take the form of assumptions regarding the outcome of project activities as well as their contribution to the achievement of the performance indicators. To ensure the evaluation and validation quality requirements, the scenarios will not represent on their own actual information upon which the validation will be made, instead will provide additional data to increase the level of precision of the evaluation and validation.

Result and added value of the deliverables

- Suggestions regarding the development of the Guidelines and dissemination at EU level
- Recommendations related to the activities and materials from the ECORailS project, in particular the ECORailS Guidelines

1. Validation Objectives

1.1 First Level: Quantitative energy and emissions savings

- Energy efficiency
 - 5% in comparison to current awarding
 - 10% with regard to the currently used rolling stock
 - 15% system-wide improvement for regional railway by 2020
- CO₂ Emissions reduction
 - 5% in comparison to current awarding
 - 10% with regard to the currently used rolling stock
 - 15% system-wide improvement for regional railway by 2020

According to Annex I of the Grant Agreement description of WP5 Task 2.3 we must also determine the secondary effects of energy efficiency and CO₂ emissions savings.

- Analysis of results referring to secondary effects
 - Identifying related effects (life quality, social impact, comfort, safety)
 - Existence of indicators and quantifying methods
 - Quantifying the related effects for effects of energy efficiency and CO₂ reduction

1.2 Second Level: Manageability of the Guidelines

The manageability of the Guidelines shall be shown by the tests or test runs at the 4 sites. Through discussion and dissemination activities the aim is to convince more PTAs to use the Guidelines in awarding projects as well as TOCs to use them in procurement projects. Although the possibility to evaluate the Guidelines use in future projects is limited, it is still possible to obtain a clear commitment by PTAs and TOCs to use the Guidelines.

- Basic Qualitative criteria for the second level:
 - Flexibility and adaptability to the users' needs and particularities
 - Efficiency of the Guidelines for the awarding procedure and awarding decision
 - Acceptability and participation (acceptance by the users of the Guidelines, efficiency for decision making: 4 agreements from PTAs and TOCs on energy efficiency and CO₂ targets)
- Other indicators for the second level:
 - ease to elaborate the awarding procedure based upon the Guidelines
 - establishing a clear and efficient scoring that meets the ECORailS objectives
 - establishing the requirements and responsibilities for the suppliers / TOC/ service
 - legal security of the documents and awarding procedures

The basic qualitative criteria and other indicators for the second level will be evaluated through Interviews or written questionnaires with PTAs and agreements from further PTAs or TOCs that consider the Guidelines as helpful and useful for awarding processes. Furthermore four agreements are intended to be made regarding energy efficiency and CO₂ targets.

1.3 Third level: Dissemination goals

- Making the proposed disseminations:

- Number of administrations/companies participating in the User Platform: 10 PTAs and 10 TOCs from at least 5 different countries
- Number of administrations/companies participating in at least one of the dissemination events: 20 PTAs and 20 TOCs from at least 8 different countries; at least 5 vehicle suppliers
- All PTAs and TOCs (as far as active in regional rail passenger transport) of the participating countries shall be informed about the project, at least by a newsletter or an invitation to events.

Table 1 Project Dissemination activities

WP	Disseminations
2	3 presentations of technology potentials at ECORailS User Platform meetings with European regional administrations and key stakeholders in awarding
4	4 presentations of the test results at international dissemination events (e. g. UIC, CER, UITP energy efficiency conferences)
4	1 Workshop with the consortium administrations on the methodology of the pilot applications
4	1 Workshop with the consortium administrations on the common and site-related goals of the pilot applications
4	1 User Platform workshop on the results of pilot applications (administration level)
5	10 interviews with decision-makers in regional rail transport on expectations and benefits and with other decision makers involved in the field
5	10 interviews with decision-makers in regional rail transport on quality criteria and with other decision makers involved in the field
6	10 contributions to professional and technical literature published
6	Campus ECORailS: 10 newsletters, 4 lectures conducted, bibliotheca installed
6	6 meetings of the ECORailS User Platform organised in two levels
6	5 training sessions for PTAs and their associations
6	4 presentations of the Guidelines on international dissemination events (e. g. UIC, CER, UITP, etc)

The feedback received from the users and stakeholders as effect to the project disseminations must also confirm the success of the integration of energy efficiency and environmental criteria in awarding procedures. Indicators such as number of participants in the meetings, conclusions presented by the participants are relevant to highlight the feedback.

2. Analysis of the works and deliverables

In order to safeguard the achievement of the ECORailS objectives, alongside the established results to be evaluated, some intermediary materials have already been evaluated in order to ensure ever since the construction phase that the materials will achieve the ECORailS goals. The same practice will be maintained for the analysis of ECORailS future deliverables.

Two main approaches will be used, in the above mentioned context:

- First, a generic evaluation approach that is aiming to analyze the intermediate materials of the deliverables, making recommendations before/ during the early stages of elaboration. By making proactive observations and recommendations WP5 is trying to ensure that the deliverables can answer to the rigors imposed by the project's objectives and users requirements
- Second, a direct approach based mainly on a WP5 analysis of the deliverables in their final form using various evaluation methods. The results of the analysis will be included in D16 "Results analysis report (M23, March 2011) and in particular D17 "Validation report including tests and recommendations" (M24, April 2011)

WP5 will evaluate and validate the Guidelines performance through the tests from the four locations whether the materials were elaborated according to the general and specific objectives of the ECORailS project, the users' feedback and expectations.

Based on the results of the four tests, as well as on own analyses and evaluations, WP5 will elaborate a synthesis of recommendations to implement the instructions and suggestions for the Guidelines' future development.

Continuous evaluation process

Since many activities have already begun simultaneously, many works are already at an advanced intermediate stage and close to finalization. Many of these works will have an important role in the elaboration of the main project output - The Guidelines – and thus have been analyzed accordingly while others, even though they have a supporting role, are just as important as far as evaluation is concerned since they give important insights regarding future works.

Further work and proceedings

According to the established chronological and object driven prioritization, the future materials will be also evaluated, based on the procedures described within the Validation Strategy. The highest priority will be attributed to the Guidelines draft versions and the other work-in-progress deliverables. Actual and further evaluation and validation activities will be focused on the data outcome for *D19: 1st draft version of Guidelines (M8)*, *D20: 2nd draft version of Guidelines ready for pilot applications (M10)* and *D22: Final version of the Guidelines (M23)*.

Table 2 Project deliverables to be evaluated in WP5

Deliverable name	Evaluation regarding	WP5 contribution
D 18: Concept for User Platform and Campus ECORailS (M2)	Basic Evaluation	Point of View
D6: Technological overview with regard to energy efficiency and environmental performance, ready to be integrated into the Guidelines (M6)	Basic Evaluation 1 st level	Point of View
D9: Legal and economic overview including legal text modules for awarding ready to be integrated into the Guidelines (M7)	Basic Evaluation 1 st level 2 nd level	Point of View
D19: 1st draft version of Guidelines (M8)	Preliminary Evaluation 1 st level 2 nd level 3 rd level	Feedback Recommendations
D7: Integration of technological feedback from the User Platform and the consortium into the Guidelines (M9)	1 st level 3 rd level	Point of View
D10: Integration of legal and economical feedback from the User Platform and the consortium into the Guidelines (M9)	1 st level 3 rd level	Point of View
D20: 2nd draft version of Guidelines ready for pilot applications (M10)	Full Evaluation 1 st level 2 nd level 3 rd level	Point of View Feedback Recommendations
D12: Pilot applications management plan (M10)	Partial Evaluation 1 st level 2 nd level	Point of View
D13: Report on the preparation of the pilot applications including test methodology (M12)	Partial Evaluation 1 st level 2 nd level	Point of View Recommendations
D21: Report on User Platform and Campus ECORailS and status of involvement, update in Month 24 (M12)	Basic Evaluation 3 rd level	Point of View
D14: Report on pilot applications (M22)	Full Evaluation 1 st level 2 nd level	Point of View Feedback
D11: Legal input for the final Guidelines version (M23)	Basic Evaluation 1 st level 2 nd level	Point of View
D8: Technological overview with regard to energy efficiency and environmental performance, ready to be integrated into the final Guidelines version (M23)	Basic Evaluation 1 st level 3 rd level	Point of View
D22: Final version of the Guidelines (M23)	Full Evaluation 1 st level 2 nd level 3 rd level	Validation Feedback Recommendations
D23: Training module for the Guidelines (M24)	Partial Evaluation 2 nd level 3 rd level	Partial Validation
D21: Report on User Platform and Campus ECORailS and status of involvement (M24)	Basic Evaluation 2 nd level 3 rd level	Point of View Feedback

3. Validation strategy and exercise plan

Taking into consideration the objectives that the Guidelines must fulfill, the validation activity must safeguard the achievement of these goals and ensure that the end product (Guidelines) is realized according to the objectives mentioned in the description of the project but it must also correspond with the expectations and requirements formulated by the users.

In this regard the main goal of Deliverable 15 “Validation strategy including validation exercise plan” is to create a comprehensive strategy that documents the future evaluation and validation activities in order to establish the main validation goals, validation methods, requirements and potential feed-back integration. The document will be aimed towards the users, on the one hand, to make them familiar with the validation process of the Guidelines and to integrate their requirements into the validation concept, and on the other hand, aimed towards other project partners to give them an insight on the validation requirements that will apply to their works.

The basis of the evaluation process in WP5 is the information received from other Work Packages.

The strategy has in view an independent evaluation and validation process taking place on two distinct levels

- First a qualitative level, which is to follow up the investigation of the modality in which the instruments and actions developed within the project are intended to check the Guidelines practical utility and to fulfill ECORailS objectives,
- Second a quantitative level, focused on the multi-criteria analysis of the solutions adopted, in order to correctly and efficiently adopt solutions to reach ECORailS objective.

The strategy’s general structure is based on an input-oriented approach for each level of the performance indicators. The complete strategic approach of the evaluation / validation process is presented in chapters 2, 4, 5 and 6.

3.1 Exercise plan

The exercise plan is the concrete way of applying the validation strategy, hence of the activities and methodology described in chapters 2-6.

Through the exercise plan, the concrete objectives, the terms, the way of work and the tasks distribution between WP5 partners and in relation with the rest of WPs are established, the conditions, necessary inputs and expected outputs are also settled.

In essence the Exercise Plan will represent the layout of evaluation and validation activities presented in a step by step manner.

Model for exercise

1 Planning the approach to establish the most adequate course of the exercise so the project’s objectives are achieved. It refers to:

- Actions / evaluations/ validation activities
- Delimitation of the tasks and responsibilities of the evaluation/ validation team members
- Work time

2. Establishing the analysis instruments

3. Evaluation/ validation process

4. Evaluation/ validation reports

5. Impact/ feedback

6. Conclusions

7. Perspectives

8. Recommendations

The action/ evaluations/ validation activities will be made on the following panels:

- a. The Analysis of the works and deliverables (Chapter 2)
- b. Validation of the project key performance indicators level 1 (Chapter 5)
- c. Validation of the second level project key performance indicators (Chapter 5)
- d. Validation of the third level project key performance indicators (Chapter 6)
- e. Validation of the Guidelines through test in WP4

Necessary inputs

- Inputs for WP5 (Table Number 2)
- List of technologies used in the pilot
- List of KPI regarding Energy efficiency and CO₂ emissions reductions defined according to UIC standards (UIC 330 and UIC 345 and other documents according to Annex 3 of D15) and applicable both in testing, delivery and operation
- List of indicators regarding related effects of the new/ refurbished vehicles
- List of indicators identified at the level of new awardings/ new rolling stock
- List of identified indicators regarding the new awarding of regional railway services
- Current awarding documentation of rolling stock and services (if applicable)
- New awarding documentation of rolling stock and services (if applicable)
- List of current railway services which will be compared with the indicators
- List of EU and national legal regulations considered within the tests
- Description of the rolling stock that is subject to awarding
- Specific data regarding the actual operation of current rolling stock
- The railcar characteristics subject to the awarding test
- Description of routes and traffic for the testing area
- The awarding documentation including the contract made based on the Guidelines. It would be useful that standardized forms should be established through the test methodology
- The technical specification that indicates the means and the form in which the supplier offers simplified LCC regarding to the savings which will be gained as a result of using the new technologies and the indicators established/recommended by the ECORailS project.
- Calculation reports regarding the quantitative energy efficiency, CO₂ emissions and related effects
- Means of verifying/ testing the KPIs
- A simplified Cost – Benefit Analysis referring to the savings which will be gained as a result of using the new technologies and the indicators established/recommended by the ECORailS project
- Points of view regarding energy efficiency and CO₂ emissions adapted to each test region
- Reports on 4 presentations of the test results at international dissemination events (e.g. UIC, CER, UITP energy efficiency conferences)
- 4 Awarding texts serving as examples for energy efficient and sustainable awarding in Europe
- Reports on 1 Workshop with the administrations on the methodology of the pilot applications
- Reports on 1 Workshop with the administrations on the common and site-related goals of the pilot applications

- Reports on 1 User Platform workshop on the results of pilot applications (administration level)
- Manageability questionnaire D15 Chapter 4
- Self evaluation questionnaire D15 Chapter 6

Note: The above list represents a preliminary list which serves information purposes that will be upgraded through the validation process.

The exercise must prove that through the testing of the Guidelines the ECORailS objectives have been achieved, the Guidelines are accepted by decision makers and represent a basis for decision-making for an energy-efficient and ecological awarding process. The Guidelines might constitute a European standard that would allow decision makers to organize awardings for regional rail transport vehicles and services using energy efficiency and environmental criteria.

The verification/ evaluation/ validation of the before mentioned documents and project deliverables as inputs for WP5 will be realized according to the methodology presented within Chapters 2, 3, 4, 5 and 6. A main element of evaluation/ validation activities will be the independent analysis of the test results. The specific activities within the tests will be analyzed simultaneously with the degree of achievement of the ECORailS goals through the use of the Guidelines.

The evaluation/ validation team will make a verification report based on the verification form presented in Chapter 3, which will be the base of the evaluation report. The validation report will be based upon the evaluation report and the validation form presented also in Chapter 3. Through the finalization of the evaluation/ validation activity not only the verification of the deliverables according to the ECORailS objectives will be made but also the perspectives of the continuous dissemination of the project's results will be drawn.

In case working parameters will change or objective work constraints appear, within an alternative scenario the revalidation of the processes is made.

The dissemination of D15 through the ECORailS website www.ecorails.eu will facilitate the development of the Guidelines by transforming it from a project specific document to EU wide usable document.

Inputs for WP5

No.	Document	Final	WP5 activities	D15 reference	D16 inclusion	D17 inclusion	Term	Obs.
1	Deliverable 18	M2	Analysis	chap. 5,6	Yes	through D16	M3	
2	Deliverable 6	M6	Analysis and recommendations	chap. 1,3	Yes	through D16	M7	
3	Deliverable 5	M6	Analysis	chap. 1,3	Yes	through D16	M7	
4	Deliverable 9	M7	Analysis and recommendations	chap. 1-6	Yes	through D16	M8	
5	Deliverable 19	M8	Analysis and recommendations	chap. 1-6	Yes	through D16	M9	
6	Deliverable 7	M9	Analysis and recommendations	chap. 1-6	Yes	through D16	M10	
7	Deliverable 10	M9	Analysis and recommendations	chap. 1-6	Yes	through D16	M10	
8	Deliverable 19	M10	Analysis, evaluation, recommendations	chap. 1-6	Yes	through D16	M11	
9	Deliverable 20	M10	Analysis, evaluation, recommendations	chap. 1-6	yes	through D16	M11	
10	Deliverable 12	M10	Analysis, evaluation, recommendations	chap. 1-6	Yes	through D16	M11	
11	Deliverable 13	M12	Analysis, evaluation, recommendations	chap. 1-6	Yes	through D16	M13	
12	Deliverable 21	M12	Analysis and recommendations	chap. 1-6	Yes	through D16	M13	
13	Deliverable 14	M22	Analysis, evaluation, possible recommendations	chap. 1-6	Yes	Yes	M23	
14	Deliverable 23	M22	Analysis and possible recommendations	chap. 1-6	Yes	through D16	M23	
15	Deliverable 8	M23	Analysis and recommendations	chap. 1-6	Yes	through D16	M24	
16	Deliverable 11	M23	Analysis and recommendations	chap. 1-6	Yes	through D16	M24	
17	Deliverable 22	M24	Analysis, evaluation, validation, recommendations	chap. 1-6	Yes	Yes	M24	

Outputs in / from WP5

1	D15 - Validation strategy incl. Exercise plan	M7	Completions/adjustments according to possible observations or newly elaborated materials	chap. 1-6	M8 - M13	
2	D16 - Results analysis report	M23	The layout, work methodology and partners' tasks will be proposed and discussed between partners. The intermediate drafts will be analyzed according to a work plan, at least in months 15 and 21.	chap. 1-6	M23	
3	D17 - Validation report, incl. Tests and recommendations	M24	The layout, work methodology and partners' tasks will be proposed and discussed between partners. The intermediate drafts will be analyzed according to a work plan, at least in months 17 and 23.	chap. 1-6	M24	
4	Participation and contributions to final works and disseminations	M26	Activities foreseen in Annex 1 and, respectively, established by the ECORailS and WP6 managing staff.	chap. 1-6	M26	
5	10 interviews with decision-makers in regional rail transport on expectations and benefits and with other decision makers involved in the field	M24	The method of unfolding the interviews and the results analysis and evaluation will be proposed and discussed with the partners. The results will be analyzed and evaluated.	chap. 6	M20	
6	10 interviews with decision-makers in regional rail transport on quality criteria and with other decision makers involved in the field	M24	The method of unfolding the interviews and the results analysis and evaluation will be proposed and discussed with the partners. The results will be analyzed and evaluated.	chap. 6	M20	
7	1 workshop with administrations and further stakeholders on the validation, recommendations and future promotion strategies, organised with 20 participants within the ECORailS User Platform	M24	Collaboration with the partners for organizing the workshops. Analysis and evaluation of recommendations.	chap. 3-IIa	M20	

3.2 Verification, Evaluation and Validation

The evaluation/ validation processes in WP5 will be finalized through a verification form which will be integral part of the D16 “Results analysis report” (Month 23), a feedback form which will also be included in the evaluation report and a Validation form which will constitute the final part of D17 “Validation report incl. tests and recommendations”.

Subsequently we present the templates for these forms containing the main chapters of the Validation Report as well as some sample validation questions (items). Even though the structure of the form is stable, the actual items are prone to change.

Verification, Evaluation and Validation Reports

The goal of the verification is to confirm that the analyzed pilot tasks are made according to the specifications in Annex I of the Grant Agreement. The verification will be in essence an independent process that will trace the activities made in WP4.

Verification steps:

- to verify the formal composition of the documents
- to verify the consistency of the fulfilled tasks compared to the proposed tasks
- to verify the methodology employed
- to verify the instruments employed
- to identify the achievement of the ECORailS objectives
- to verify the results

In the verification process a series of actions must be undertaken to confirm that:

1. The pilot tasks have been well structured and accomplished and that the results offer sufficient information to validate the Guidelines.
2. The obtained information accurately reflects the aim of the project

Verification Report

The main part of the Verification Report is going to be the Verification Form which will be filled in the Evaluation period in WP5. The Verification report will be usable in the following situations:

1. the verification method is agreed upon by all project partners and found acceptable
2. the processes will reveal whether verified items correspond or not to the rigors of the project

The Verification Form will consist of a checklist where questions will be answered with simple yes/ no answers. To answer positively to a question the performance criteria inquired must be fulfilled.

The template for the verification form:

Verification form

Location		
Pilot name		
Pilot Responsible Name		
Verifier Name		
Question	Answer	
	Yes	No
Chapter I. Formal and Procedural aspects		
Was all documentation made available to the validation team?		
Were the formal requirements (Project Management Handbook and Grant Agreement) regarding document templates respected?		

Was the information flow made according to the formal requirements in the Project Management Handbook so that all relevant data is distributed accordingly?		
Was the information made available to the verification team, the work concept and results forms according to the validation needs?		
Were the activities developed according to a specified work plan?		
Chapter II. Methodological aspects		
Was the test conducted according to the pilot applications and test methodology (Annex I Grant Agreement, WP4, Task 2)?		
Was the test conducted according to the regional specific of each area as delimited in Annex I Grant Agreement, WP4?		
Do the test activities cover the area of the KPI?		
Were the main activities relevant for the achievement of the ECORailS objectives identified and presented clearly?		
Were there objective deviations in the activities proposed in the work plan?		
Were calculations made to determine the quantitative 1 st level indicators?		
Are the methods used to determine the quantitative appropriate (commonly used, generally accepted through norms and standards, or reasonable)?		
Have sufficient actions been undertaken to evaluate the Guidelines' manageability?		
Are there documents that reflect the users' opinions regarding the flexibility and adaptability of the Guidelines?		
Are there documents that reflect the users' opinions regarding the acceptability and participation towards the Guidelines?		
Are there instruments that measured the satisfaction of the users involved in disseminations?		
Were user opinions integrated in the Guidelines?		
Were WP5 recommendations considered in the elaboration of final deliverables/ final version of the Guidelines?		
Chapter III Results Presentation		
Were the ECORailS objectives accurately reflected in the information created in the project?		
Were the results of each activity correctly formulated?		
Are the conclusions synthetically formulated and do they cover performance indicators references?		
Are all indicators clearly defined and possible to measure/ compare?		
Have four Agreements on the energy efficiency and CO ₂ targets been realized?		
Was the number of interested administrations - 10 PTAs and 10 TOCs achieved?		
Were all proposed dissemination activities realized?		

Do the test results confer sufficient information to validate the Guidelines?		
Do the test results prove that the Guidelines are an effective decision support tool which is a basis for decision-making for an energy-efficient and ecological awarding process?		
Can the test results become a support to regulate at EU level the usage of the Guidelines that provides administrations with decision guidance on how to integrate and evaluate energy efficiency and environmental criteria in regional awarding?		

In case the answers are mostly negative a feedback form will be made and completed:

Feedback form

Verifier Name Pilot name Pilot Responsible Name
Text Feedback Text

Signature

Date

Based on Report No

Verifier Name

The validation will be made in the following situations:

The verification of Chapter I Formal and Procedural aspects was made and passed.

The verification of Chapter II Methodological aspects was made and passed.

The verification of Chapter III Results Presentation was made and passed.

Validation form

Location	
Pilot name	

Pilot Responsible Name				
Validation Team				
Question	Validated		Reference*	
	Yes	No		
Chapter I Formal and Procedural aspects				
Were the pilot documentation and reports made available to the validation team?				
Were all reports integral and filled according to the requirements formulated in D15 Validation Strategy Including Exercise Plan?				
Chapter II Methodological aspects				
Do the first level PIs - Quantitative energy and emission savings achieve an improvement of energy efficiency by 5% in comparison to current awarding?				
Do the first level PIs - Quantitative energy and emission savings achieve an improvement of energy efficiency by 10% in comparison to currently used rolling stock?				
Do the first level PIs - Quantitative energy and emission savings achieve an improvement of energy efficiency by 15% by 2020?				
Do the first level PIs - Quantitative energy and emission savings achieve a reduction of CO ₂ emissions by 5% in comparison to current awarding?				
Do the first level PIs - Quantitative energy and emission savings achieve a reduction of CO ₂ emissions by 10% in comparison to currently used rolling stock?				
Do the first level PIs - Quantitative energy and emission savings achieve a reduction of CO ₂ emissions by 15% by 2020?				
Do the second level PIs - Manageability of the Guidelines achieve the flexibility and adaptability requirements?				
Do the second level PIs - Manageability of the Guidelines achieve the efficiency for decision-making requirements?				
Do the second level PIs - Manageability of the Guidelines achieve the acceptability and participation requirements?				
Do the third level PIs - Scope of dissemination achieve the requirement to involve 10 PTAs and 10TOCs?				
Chapter III Results Presentation				
Does the created information within the project accurately reflect the ECORailS objectives?				
Are the results of each activity clearly formulated?				
Are the conclusions synthetically formulated and do they refer to the project's PI?				
Are the indicators resulting from WP4 clearly defined and possible to measure and compare?				

From a legal point of view, are the Guidelines specifications clearly defined in order to support the method of evaluation of the awarding?			
Do the legal requirements impose that the supplier is responsible for the provided data during the entire life cycle of the product			
Are there documents that reflect the users' opinions regarding the flexibility and adaptability of the Guidelines			
Are there documents that reflect the users' opinions regarding the acceptability and participation towards the Guidelines			
Were the proposed disseminations realized?			
Do the test results confer sufficient information to validate the Guidelines			
Do the test results prove that the Guidelines are an effective decision support tool which is a basis for decision-making for an energy-efficient and ecological awarding process			
Can the test results become a support to regulate at EU level the usage of the Guidelines that provides administrations with decision guidance on how to integrate and evaluate energy efficiency and environmental criteria in regional awarding			

Comments

Considering minor deviations some items might be valid if some minor improvements will be made according to recommendations

* Unlike the Verification form where simple yes/no answers are sufficient, the validation answers must be documented and clear. References will be made to project deliverables, test results, projects reports, conclusions, minutes of meetings or any other relevant document.

Note: The content of the verification/ validation form is solely for information purposes since the precise validation approach will be defined later during the project's development. The forms serve however as a template for the actual verification/ validation forms.

4. Validation strategy for the project's first level key performance indicators

The proposed validation strategy considers that the first test of the ECORailS Guidelines – which will take place through the pilot applications carried out within WP4 “Pilot applications” – will also constitute the main validation component, especially for the quantitative performance indicators.

This is the reason why a strong collaboration between WP4 and WP5 is necessary.

On the basis of the Guidelines and other works from WP2 “Technologies”, WP3 “Legal frames and awarding procedures”, and WP6 “Communication and Dissemination”, an awarding procedure will be simulated and tested in real conditions.

For the test, an awarding documentation will be elaborated, or an existing one will be modified, in order to include the criteria and know-how from the ECORailS project.

Data, rules and procedures describing the current situation will be used and the variables/parameters will be changed, according to the performance enhancement task imposed by the ECORailS objectives. The Guidelines validation – as a basis of the decision process for the efficient awarding from an energetic and ecologic point of view and the clear emphasis of the TOC, PTA and IM responsibilities – will be realized through the tests in the four locations.

On the basis of the feedback, WP5 will supply a synthesis of recommendations for the implementation of the Guidelines and suggestions for further development.

4.1 Energy efficiency quantitative indicators

In the awarding documentation, prescriptions/ recommendations will be included regarding technical characteristics, technologies used and operation mode, according to the Guidelines and the documents from WP2, WP3 and other bibliographical materials established.

The energy efficiency indicators have to be clearly defined, measurable – the verification and measurement mode being indicated (upon equipment delivery and/or during exploitation).

The demands and efficiency indicators will be established in the awarding documentation, and the suppliers will have to answer to these requests by filling in custom forms, so that different offers can be easily compared between them.

In the awarding documentation, evaluation criteria will be established for the offers, which will lead to promoting the most competitive offers from the point of view of ECORailS criteria.

The quantitative evaluation will be done by:

- Analyzing each efficiency indicator, setting energy and emissions savings which will result in a specific time frame, depending on the evolution of the respective indicator.
- Verifying the assessment/measurement method of each indicator (upon equipment delivery and/or during exploitation) – from a technical point of view (according to regulations) and from the authorization point of view (standards, legal provisions, rail ratifications/authorizations, metrology, instructions given by the supplier, etc.)
- Simplified LCC/CBA calculations through which savings will be determined that will result from introducing the ECORailS criteria and methodology in the awarding procedure.
- The calculation methodology could afterwards be completed with estimation/quantification methods resulting from examples realized and verified by the PTAs, TOCs, suppliers and/ or through other European/ international projects, norms, regulations or important scientific works.

The evaluation procedures for the quantitative indicators will be applied for the following three situations:

- a) By comparing to the current awarding

The effects of modifications/new procedures introduced, will be traced. The results will be discussed and compared with the ECORailS objective of obtaining a 5% saving

b) By comparing to the currently used rolling stock

The results will be discussed and compared with the ECORailS objective of obtaining a 10% saving

c) By extrapolating the energy efficiency results (scenarios) in the regional transport by 2020.

The results will be benchmarked against the ECORailS objective of obtaining a 15% saving

Within the ECORailS project this quantitative evaluation will be done by:

- The tests carried on within WP4, in the four locations.
- The works under WP4 will start by preparing the pilot applications and establishing a test methodology. By leveling the sources (Guidelines and appendix documentation) and through the test methodology the standardization of test procedure will be assured. However, the different specific conditions at the four locations and the test objects will generate some distinct characteristics, as well as particular methods for solving them and, respectively, of evaluating the quantitative indicators.
- The final recommendations which will be made in WP4, taking into consideration the particularities of the four locations and the aim that the Guideline will permit the EU wide introduction of the ECORailS criteria and methodology.
- Tests' evaluation and validation within the WP5 activities and deliverables.
- The analysis which will take place within the User Platform, the ECORailS Campus, the trainings, the workshops and disseminations.

Regarding LCC calculations within the ECORailS tests:

- it's not necessary for the LCC calculation methodology to be standardized and unanimously accepted, but the methods used will be in line with the sector-wide used tools.
- this methodology will be recommended by WP2 and/or by WP4 and WP5, for allowing the necessary calculations for quantifying the energy savings and for comparing with the ECORailS objectives.
- the LCC calculations do not refer to all operation and maintenance costs, but will constitute calculations referring to the savings which will be gained as a result of using the new technologies and the indicators established/recommended by the ECORailS project.

Regarding LCC calculations within real awarding:

- The specifications will impose that the suppliers offer only the results of the LCC calculations, results completed – on categories of expenses – according to some standardized forms, so that the offers can be easily compared and evaluated.
- The Contracting Authority will have to lay down the general operation conditions as well as the supplier's responsibility for the data supplied.
- The suppliers will establish the conditions and activities needed in the operation activity so as to respect the LCC data provided in the offer.
- The suppliers will install on the rolling stock, the necessary measurement equipment and the data diagnosis and recording software.
- The assistance software for the operation and maintenance activities, based on direct data collection, will allow for the recording of data related to the efficiency indicators and LCC, as well as for the verifying of the compliance with the conditions established by the supplier.

According to the elaboration and acceptance stage of some modern technologies for LCC calculations, especially for rolling stock and oriented towards emphasizing the energy saving and emission reductions (by means of Railenergy project and/or other projects), the operative application of these results within the tests and/or of ECORailS deliverables will be attempted.

4.2 Quantitative indicators referring to CO₂ reduction

In the award documentation prescriptions / recommendations will be introduced referring to the technical characteristics, the technologies applied and the operation modality, in keeping with the Guidelines and the documents from WP2, WP3 as well as with other bibliographical materials.

Technically, the CO₂ emission reduction indicators should be: clearly defined and possible to measure/ verify/ compare (upon equipment delivery and throughout its service life, respectively)

In the award documentation, the requirements and the CO₂ emission reduction indicators shall be set, while the suppliers shall meet these requirements by filling in certain standardized documents, so that various offers may be easily and rigorously compared and evaluated.

In the award documentation criteria for the evaluation and scoring of offers will be set, which should make it possible for the most competitive offers in terms of ECORailS criteria to be promoted.

The quantitative evaluation shall be made as a result of:

- the analysis of each CO₂ emission reduction indicator, by determining the savings resulted over a time duration according to the evolution of the respective indicator
- the check up of the modality of verification / measure of the CO₂ emission reduction indicator (upon equipment delivery and / or during operation) – technically (according to the standards) and in point of authorization (standards, legal provisions, railway certifications / authorizations, metrology, manufacturer's instructions etc.).
- calculation methodology which may be completed with estimation / quantification modalities resulting from examples achieved and verified by PTAs, TOCs, suppliers and / or through other European projects or reference scientific papers.

The procedures for evaluating the quantitative indicators referring to the reduction of CO₂ emission shall be applied for the following 3 situations:

- a) By comparing to the present award procedure.
The effects of the modifications/ new procedures introduced shall be followed up. The results shall be commented upon and compared to ECORailS objective, namely a 5% saving.
- b) By comparing to the existing rolling stock.
The results shall be commented upon and compared to the ECORailS objective, namely a 10% saving
- c) By extrapolating the results (scenarios) of CO₂ emission reduction in the regional transport by 2020. The results shall be commented upon/ compared to the ECORailS objective, namely a 15% saving

Under ECORailS project, this quantitative evaluation shall be made through:

- The tests conducted under WP4, in the four locations.

The first data regarding the first level KPI (energy efficiency and CO₂ emissions) are to be collected from the tests in the four regions. Although the data have strong regional specificity they will represent the first step by offering an image of the potential of the achievement of the ECORailS goals in regards to energy efficiency and CO₂ emissions.

- The final conclusions to be made under WP4, taking into account the particular characteristics of the four areas and the target that the Guidelines may allow for ECORailS criteria and methodology to be implemented into all the EU countries

The ECORailS objectives in regard to energy efficiency and CO₂ emissions refer to potential savings by applying the Guidelines at EU level and thus WP5 will collect the estimations regarding the EU wide applicability of the Guidelines.

- The test evaluation and validation within WP5 activities and deliverables

Finally, WP5 will backtrack the calculations made regarding energy efficiency and CO₂ emissions at regional level and estimations regarding the EU wide applicable Guidelines and check for errors, inconsistencies between the calculations and estimations in each area. The independent evaluation in WP5 must confirm that the test results are accurate.

The analyses will be made under the Users' Platform, ECORailS Campus, the training workshops and disseminations.

4.3 Results regarding related effects

Starting from emission savings and energy savings, indicators that measure their effects (quality of life, social impact, comfort, safety degree, regularity) will also be estimated and determined, where possible, considering the distinct conditions in various regions. Scenarios will be designed and analyzed in order to present a complete image alongside indicators determined in the previous subtasks.

Three step evaluation methodology:

- Identifying the collateral effects (life quality, social impact, comfort, safety, environment)
- Investigating the existence of indicators and quantifying methods
- Quantifying connected effects for energy efficiency and CO₂ emissions savings.

5. Validation strategy for the project's second level key performance indicators

The Guidelines themselves have to be highly usable in real life awarding. In this regard the manageability factors are very important for the project's success. The validation process is highly user oriented, based upon qualitative evaluation methods that focus on user expectations, feedback and acceptance. Considering that the Guidelines are developed according to tests in four regions but should be EU wide applicable we consider that this factor is also important.

Basic Qualitative criteria for the second level:

- Flexibility and adaptability to the user's needs and particularities
- Efficiency of the Guidelines for developing the awarding procedure and awarding decision
- Acceptability and participation (acceptance by the users of the Guidelines, efficiency for decision making: 4 agreements on energy efficiency and CO₂ targets)

The main method used for the manageability evaluation is the questionnaire and interviews with PTAs and agreements from further PTAs or TOCs that consider the Guidelines as helpful and useful for awarding processes. Taking into account the qualitative nature of the process the results will be presented in a user-friendly format using scoring methods.

The manageability of the Guidelines shall be demonstrated by analyzing the preliminary – and the operation tests in the four locations.

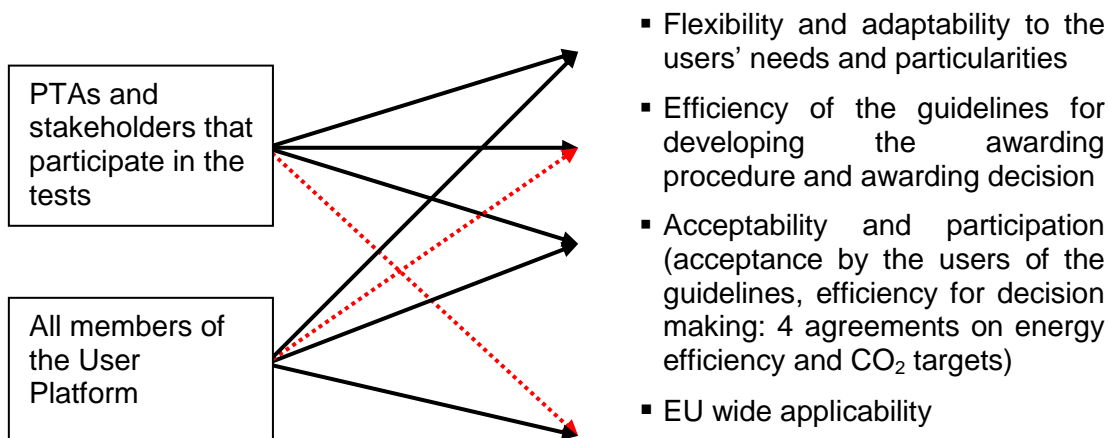
Steps of manageability evaluation / validation

- Step 1 – Verifying the accomplishment of the manageability criteria
- Step 2 – Verifying the integration of user opinions
- Step 3 – Verifying test results
- Step 4– Possibilities for enlarging the area of implementation and for optimization of instructions, following the tests and User Platform conclusions (final Guidelines)
- Step 5 – Validation

Regarding the evaluation of the manageability of the Guidelines two distinct sets of questionnaire will be elaborated corresponding to two sets of identified users. The main criterion used to differentiate between the sets of users is the involvement of each group in the test activities.

The first group to be considered is composed of PTAs and other stakeholders that participate in the tests. The members of the first group have first hand view of the Guidelines in use and based upon their opinions and indications very reliable information regarding the manageability (all three qualitative criteria) of the Guidelines can be obtained. Some information regarding EU wide applicability of the Guidelines can be obtained from answers from the first group. Due to the limited number of representatives from the first group further input will be required in order to fully assess the EU wide applicability of the Guidelines.

The second group considered will comprise all members of the User Platform (PTAs, TOCs, IMs and other stakeholders) especially those members that have not participated directly in the tests. Even though from the members of the second group less information regarding the strict manageability (mostly on flexibility and acceptability criteria) of the Guidelines can be collected (information derived mostly from impressions and reports), more input can be obtained regarding EU wide applicability of the Guidelines.



Solid black lines symbolise strong information to be obtained regarding the respective manageability criteria
Dotted red lines symbolise weak information to be obtained regarding the respective manageability criteria

The proposed questionnaires will be based on a set of questions aimed towards the description of the three qualitative manageability criteria and EU wide applicability of the Guidelines. The questions will be designed to be answered via five degrees of appreciation as following:

- Very low degree – the defined objectives for each criteria are not at all achieved, the Guidelines totally lack flexibility and adaptability, efficiency to develop the awarding procedure and awarding decision, acceptability and EU wide applicability
- Low degree – the defined objectives for each criterion are largely not achieved, the Guidelines largely lack flexibility and adaptability, efficiency to develop the awarding procedure and awarding decision, acceptability and EU wide applicability
- Inconclusive - the defined objectives for each criterion are proportionally achieved and unachieved, the Guidelines present some flexibility and adaptability, efficiency to develop the awarding procedure and awarding decision, acceptability and EU wide applicability
- High degree - the defined objectives for each criterion are in majority achieved, the Guidelines have sufficient flexibility and adaptability, efficiency to develop the awarding procedure and awarding decision, acceptability and EU wide applicability
- Very high degree - the defined objectives for each criterion are fully achieved - the Guidelines have a high degree of flexibility and adaptability, efficiency to develop the awarding procedure and awarding decision, acceptability and EU wide applicability.

The results of the questionnaires are to be presented in D16 “Results analysis report” and represent the main manageability evaluation and validation element. For user friendly purposes, the results will be presented and interpreted by using scores. The following layout for scores will be used:

Each degree of appreciation has an integer number attributed to it. Starting from “Very low degree” which has “-2” points attributed to it, “Low degree” has “-1” points attributed to it “Inconclusive” has “0” points attributed to it High degree has “1” points attributed to it “Very high degree” has “2” points attributed to it.

Table 3 Degrees of appreciation score

Degrees of appreciation	Score
Very low degree	-2
Low degree	-1
Inconclusive	0
High degree	1
Very high degree	2

Considering the given symmetric scoring scale (instead of using a standard ascending scale) the validation threshold is situated at:

“maximum appreciation score” * 1/2 * n, where “n” is the number of questions and the “maximum appreciation score” is the score obtained by one question at “Very high degree”. In this particular case (where the score for Very High degree is “2” – highest possible score to be obtained by one question) the Validation threshold is situated at 2 * 1/2 * n. The advantage of the symmetric scoring scale is that the validation threshold corresponds to the hypothetical case when all issues could be appreciated to be at a High Degree: 2 * 1/2 * n (validation threshold)= 1*n (hypothetical case when all answers “n” are appreciated to be at High Degree “1”), ensuring a high quality validation process.

For example considering a four questions sample and the above presented scoring scale the validation threshold is situated at 2 * 1/2 * 4 = 4. This validation threshold corresponds to the hypothetical case of all questions are answered with high degree appreciations e.g. 1 * 4 = 4, this ensuring a high quality validation threshold for manageability.

Questionnaire template

Category	Question	Degrees of appreciation					Comment**
		VLD	LD	N	HD	VHD	
Flexibility and adaptability	*Text Question Text						
	*Text Question Text						
	*Text Question Text						
Efficiency of the Guidelines	*Text Question Text						
	*Text Question Text						
	*Text Question Text						
Acceptability and participation	*Text Question Text						
	*Text Question Text						
	*Text Question Text						
EU wide applicability	*Text Question Text						
	*Text Question Text						
	*Text Question Text						

* Note: The questions themselves will be elaborated and calibrated during the WP5 Task 2

**Note: For every answered question it is important to provide a comment justifying your choice

It is necessary that:

- the provisions and the procedures of the award documentation should be clear, not prone to interpretations, and support the evaluation and calculation modality of the award criteria, so as to ensure the success of the best offer choosing
- the provisions shall impose the supplier’s responsibility for the compliance with the data supplied throughout the service life.

5.1. Main input - Tests and conclusions from the four areas

- Qualitative evaluation tools
 - Internal protocols (conclusions, idea library)

The main tool used to evaluate and validate the manageability conditions that will be revealed by the four tests, is a checklist that will compare the ECORailS manageability objectives with the conclusions resulted in various stages of the tests and the tests' outcomes. The process is of internal nature requiring input solely from WP4, with very little or no outside information required. Since using the before mentioned evaluation and validation tool, final results are not mandatory to draw relevant conclusions, partial or preliminary data being just as useful, the checklist application will take the form of a continuous process until the tests completion. The checklist will be elaborated in the Evaluation phase (Task 2) of WP5 and it will be distributed for usage to WP4 partners and WP5 partners. WP5 will employ the checklist as a third party using mainly objective observations while WP4 will employ it using subjective observations.

The Checklist and the conclusions regarding the manageability of the Guidelines drawn after the analysis of the outcomes will be presented as part of D16 "Results analysis report".

- Evaluation methodology
 - Step 1 – Verifying the accomplishment of the regionally defined manageability criteria

Since the four test areas present regional specificity it is important to take these specifics into consideration when establishing the manageability criteria. Based upon the test development in each test area some manageability criteria may be defined solely for a specific test site. The achievement of these specific manageability criteria must be analyzed and validated using the same tools as in the case of general ECORailS manageability criteria. Although these regional specific criteria are not as important as general manageability criteria, they are a relevant part of the evaluation and validation activities in WP5.

- Step 2 – Verifying individual test results

In a decentralized manner the test results will constitute themselves as major input for the WP5 analysis and validation of the manageability criteria. Since the individual test conclusions are just as relevant as the aggregate test conclusions regarding manageability criteria, they are to be evaluated and validated separately.

- Step 3 – Expansion possibilities and optimization following the tests and User Platform (final Guidelines)

The test results and User Platform will constitute an important input for WP5 regarding the general manageability and the evaluation of the EU wide applicability of the Guidelines. The main tool used to evaluate the EU wide applicability of the Guidelines is the checklist and the questionnaire applied to the users involved in the tests. The results of both the questionnaire and the checklist will be presented in D16 Results analysis report

- Step 4 – Validation

This step involves the actual validation based upon the previously presented evaluations. The validation is phased according to the defined validation protocols and procedures.

5.2. Main input - Tests and conclusions regarding EU wide applicability

- Qualitative evaluation tools
 - User Platform Interviews

The main tool used to evaluate and validate the EU wide applicability potential of the Guidelines is a questionnaire/ interview with all relevant PTAs and other stakeholders, participating in the test or participants in the User Platform. Due to the fact that the four test areas can represent a proxy for Europe the information collected from the PTAs who participated in the tests is relevant to determine the applicability of the Guidelines at a European level. However due to the necessity of

more relevant data, input from all stakeholders participating in the User Platform is required due to their high representativeness at EU level. WP5 will consider the user opinions based upon the test results and other relevant information and use them in conjunction with the test participating PTA's conclusions and aggregate the answers to draw one final conclusion regarding EU wide applicability of the Guidelines. The questionnaire will be elaborated in WP5 Task 2 and the results of the questionnaire and the conclusions will be presented in D16 "Results analysis report"

- Feedback from:
 - ECORailS Campus
 - ECORailS User's Platform meetings
 - training sessions for PTAs and their associations
 - presentations at international event dissemination sessions (e.g. UIC conferences, CER, UITP referring to energy efficiency)

In addition to the questionnaire complementary information will be gathered as users' points of view regarding EU wide applicability of the Guidelines. The various occasions and time intervals in which these points of view will be gathered (via short open questions) will correspond to major ECORailS project events such as the ECORailS User Platform meetings and ECORailS Campus.

- Evaluation methodology

- Step 1 – Verifying the general accomplishment of the manageability criteria

Unlike the previous case where regional specifics were taken into consideration when establishing the manageability criteria, in this case the overall manageability criteria must be evaluated. Based upon common test development in each test area, the overall manageability criteria will be analyzed and evaluated and achievement of manageability criteria will be analyzed and validated using the tools mentioned above. Due to the fact that the overall manageability criterion is highly important for the project success, its analysis and validation will require an important part of the validation effort.

- Step 2 – Verifying the EU wide applicability based on the users' opinions, from the test areas

Based upon the stakeholders' opinions collected in the User Platform an accurate scenario can be created in order to show that the Guidelines cannot only be used successfully in the test areas but also at a European level.

- Step 3 – Verifying overall test results

In a centralized manner the test results will constitute themselves as major input for the WP5 analysis and validation of the manageability criteria. Since the overall test conclusions are just highly relevant regarding manageability criteria, and thus they are to be evaluated and validated in a common manner.

- Step 4 – Expansion possibilities and optimization following the tests and User Platform (final Guidelines)

The aggregate test results and User Platform will constitute an important input for WP5 regarding the general manageability and the evaluation of the EU wide applicability of the Guidelines. The main tool used to evaluate the EU wide applicability of the Guidelines is the questionnaire applied to the users involved in the tests. The results of both the questionnaire will be presented in D16 "Results analysis report"

- Step 5 – Validation

This step involves the actual Validation based upon the previously presented evaluations. The Validation is phased according to the defined validation protocols and procedures

5.3. Main input - User Platform meetings and ECORailS campus

- User Feedback and Recommendations

The ECORailS User Platform participants represent the main source for user feedback and recommendations that are used to adjust and fine tune the majority of the elements involving the evaluation and validation processes. As the Guidelines must specifically be designed to fit user needs, their opinion regarding the final Guidelines as well as their various development stages is highly relevant.

- Qualitative evaluation tools

- User Platform Interviews
- Questionnaires
- Individual opinions
- Group opinions

The main tools to evaluate the manageability conditions and EU wide applicability of the Guidelines that will derive from the users' opinions and feedback is the questionnaire delivered in the form of interviews. The EU wide applicability factor is highly relevant in this case due to a high EU representativeness of the users at EU level. Even though some of the User Platform participants have only an indirect overview regarding the guideline's tests, feedback regarding the acceptability and adaptability of the Guidelines is still expected.

- Evaluation methodology

- Step 1 - Comparative exercise referring to the integration of the users' expectations and needs into the Guidelines

The first step involves that WP5 ensures that the Users' needs, expectations and relevant feedback is integrated into the Guidelines. This will be done using a checklist which uses the users' feedback as input and comparing the checklists' content with the Guidelines.

- Step 2 – Conclusions

Based upon user input and interview results, conclusions can be drawn regarding the integration of users' needs and expectations in the Guidelines, EU wide applicability and specific manageability criteria of the Guidelines. The results will be compiled in a single form and integrated in D16 "Results analysis report"

- Step 3 - Recommendations

To ensure a high quality of the final Guidelines, based on the checklist, recommendations can be made to integrate the users' needs and expectations into the Guidelines where applicable. The recommendations will be made as soon as they are available in order to ensure an active integration process

6. Validation strategy for the project's third level key performance indicators

Four step methodology

- **Step1– Verifying the accomplishment of the dissemination related project outputs**

A simple checklist type approach will be used to verify that the number of proposed disseminations is actually accomplished during the project's development.

Number and type of disseminations to be verified

- 10 interviews with decision-makers in regional rail transport on expectations and benefits and with other decision makers involved in the field
- 10 interviews with decision-makers in regional rail transport on quality criteria and with other decision makers involved in the field
- Number of administrations/companies participating in the User Platform: 10 PTAs and 10 TOCs from at least 5 different countries
- Number of administrations/companies participating in at least one of the dissemination events: 20 PTAs and 20 TOCs from at least 8 different countries; at least 5 vehicle suppliers
- All PTAs and TOCs (as far as active in regional rail passenger transport) of the participating countries shall be informed about the project, at least by newsletter or invitation to events.
- The dissemination through the ECORailS website – www.ecorails.eu

- **Step 2 – Verifying WP4 tests results dissemination**

The dissemination activities made in WP4 are especially relevant since they present first hand information regarding test results. Using the same checklist type approach WP5 verifies that the disseminations have been made according to the specifications in Annex I of the Grant Agreement

Verifying the number of disseminations

- 4 presentations of the test results within international dissemination events (e.g. UIC, CER, UITP conferences on energy efficiency)
- 1 workshop with the administrations on the methodology of the pilot applications
- 1 workshop with the administrations on the shared- and location related objectives of the pilot applications
- 1 workshop of the User Platform on the pilot applications results (administration level).

- **Step 3 – Verifying WP6 specific dissemination outputs**

WP5 must also ensure that the dissemination activities performed in WP6 are made according to the specifications in Annex I of the Grant Agreement. The most relevant dissemination-feedback events that are going to be analyzed are the User Platform Meetings and ECORailS Campus. The verification will take the form of a comparison between the objectives of these events and their achieved effect.

- 10 contributions to the professional- and technical literature published
- ECORailS Campus: 10 newsletters, 4 conferences, setting up of an online library
- 6 ECORailS User's Platform meetings organized at two levels
- 5 training sessions for PTAs and their associations
- 4 presentations of the Guidelines referring to the international event dissemination sessions (e.g. UIC- CER- UITP conference on energy efficiency)

- 1 advertising flyer referring to the project

- 1 final conference

- **Step 4 – Validation**

- Binary validation criteria (yes/ no)

By employing a simple yes/ no validation we ensure that the validation process is as comprehensible as possible.

- Validation Report

The validation results will be included in D17 “Validation report incl. tests and recommendations”

The quality of the dissemination process

1. Project documents that result from dissemination activities of each Work Package
2. Minutes of the meetings
 - User Platforms
 - Workshops
 - ECORailS Campus
3. Results of the interviews
4. Training sessions for the PTAs
5. Media appearances and international events

The evaluation of the quality of the project’s dissemination activities will be based upon the individual dissemination reports generated in respective work packages that should contain “customer’s satisfaction” type evaluations. Based on the analysis of the individual reports, an overall report will be made in WP5 and integrally included in D16 “Results analysis report”.

7. Test Analysis, Evaluation and Validation

As the tests under WP4 represent a very important part for the project outcomes, in this chapter we are presenting a standpoint on these tests and on the modality in which WP5 will analyze, evaluate and validate the results.

In keeping with WP4 objectives the pilot applications should each present a transport plan showing the regional rail transport vehicles and services to be analysed. It also has in view the application of the specifications in these plans which will be proposed in the Guidelines for being included into the contracts of the Regional Railway Public Services in order to achieve the targets regarding higher energy efficiency and environmental protection.

EU Directive 2009/33 shall come in force starting from December 2010, calling for the introduction of the criteria referring to the impact on energy consumptions and on the environment, as generated by the application of the new means of transport / services, into any award process.

The pilot applications shall be developed in four European regions: Berlin, Timisoara, Øresund and Brescia; they will keep with the WP4 objectives, but may differ in terms of the development modality and of the tools used.

The protocols drawn up upon test completion shall include, besides conclusions of the performers of each application, a self-evaluation of the compliance of the results obtained with ECORailS based on filling in a questionnaire which should include the following information:

Table 4 Self evaluation questionnaire for the WP4 test teams

No	Target issues	Answer		Remarks*
		YES	NO	
1	Did the specifications in the Guidelines provide the required information for the new data inserted into the documentation?			
2	Were there any identified provisions going against the regional legislation / standards?			
3	Did the actors (TOC, PTAs) currently involved in awarding processes in the target area participate in this activity without any reservation?			
4	Was the usefulness of the Guidelines understood by the actors (TOC, PTAs) currently involved in awarding processes in the target area?			
5	Were the users' expectations regarding the Guidelines test modality met?			
6	During the test progress, were any measures or actions proposed aimed at enhancing the Guidelines?			
7	As a result of applying the instructions under the Guidelines, can the (economic, ecologic) gains of the actions developed be easily quantified as compared to similar activities which did not benefit from the Guidelines know-how?			
8	Are the objectives of the awarding processes based on the Guidelines achievable from a financial and strategic point of view?			

11	Will the adopting of certain solutions according to the Guidelines lead to a reduction in energy consumption by 5% and in CO ₂ emissions by 5% as compared to the present awarding employed?			
12	Will the adopting of certain solutions according to the Guidelines lead to a reduction in energy consumption by 10% and in CO ₂ emissions by 10% as compared to the present rolling stock?			
13	Will the adopting of certain solutions according to the Guidelines lead to 15% benefits for energy consumptions and to 15% benefits for CO ₂ emissions reduction in the perspective of year 2020			
14	Will the adopting of solutions according to the Guidelines lead to an improvement regarding the related effects?			
15	Should this type of instructions be generalized throughout the European Union?			
16	Are the Guidelines tailored to the users' needs and particularities?			
17	Are the Guidelines useful and acceptable?			
18	With a view to making the Guidelines application compulsory in EU regional railway transport, should a law and possibly other measures (standards, directives etc.) be proposed and passed in the European Parliament?			
19	Does the information presented in the Guidelines exceed your existent know-how?			
20	Were there any reasons (actions, approach modalities, addressing language etc.) for dissatisfaction throughout the tests?			

*Note Under the "Remarks" column, all information the test participants consider useful, related to the specific problem under the respective item may inserted.

Unlike the previous questionnaire where the questioned users were directly involved in the tests, the following questionnaire is addressed to all stakeholders. The aim of this short questionnaire is to evaluate that the flow of information obtained within the tests has correctly reached all users and stakeholders.

Table 5 Questionnaire for the users regarding the tests

No	Target issues	Answer		Remarks
		YES	NO	
1	Was the usefulness of the Guidelines understood by the stakeholders (TOC, PTAs)?			
2	Were you familiar with the technologies proposed in the Guidelines and used in the test?			
3	Were the Guidelines generally useful and generally accepted?			
4	Did the information presented in the Guidelines exceed your existent know-how?			

5	Were there any reasons (actions, approach modalities, addressing language etc.) for dissatisfaction throughout the tests?			
6	Was the dissemination of the Guidelines and test results clear comprehensive?			
7	Did modified/ new awarding procedures generate 5% energy efficiency compared to current awarding?			
8	Did modified/ new awarding procedures generate 5% CO ₂ reduction compared to current awarding?			
9	Did modified/ new awarding procedures generate 10% energy efficiency compared to current rolling stock?			
10	Did modified/ new awarding procedures generate 10% CO ₂ reduction compared to current rolling stock?			
11	By extrapolating the energy efficiency results (scenarios) in the regional transport by 2020 can a 15% increase in energy efficiency be estimated?			
12	By extrapolating the CO ₂ consumption results (scenarios) in the regional transport by 2020 can a 15% decrease in CO ₂ emissions be estimated?			
13	Were the energy efficiency indicators considered in the awarding documentation?			
14	Were prescriptions/ recommendations relating to technical characteristics included in the awarding documentation?			
15	Were evaluation criteria and grading scales which will lead to selection of the most competitive offers from the point of view of ECORailS, included in the awarding documentation?			
16	Were specific requirements that the supplier should provide LCC calculations, included in the specifications?			
17	Were specific requirements that the supplier should assume responsibility for the data provided, included in the specifications?			
18	Have some elements of the Guidelines remained untested due to regional specificity?			
19	Have some elements of the Guidelines remained untested due to no specified reason?			
20	Did the specifications in the Guidelines provide the required information for the new data inserted into the documentation and the award procedure to be supported by legislation and standards?			
21	Were the Guidelines adapted to the specific needs in the Berlin region?			
22	Were the Guidelines adapted to the specific needs in the Brescia region?			

23	Were the Guidelines adapted to the specific needs in the Øresund region?			
24	Were the Guidelines adapted to the specific needs in the Timisoara region?			
25	Can the regional testing of the Guidelines and the results be extended EU wide?			
26	Were there any measures or actions aimed at enhancing the Guidelines proposed during the test progress?			
27	Were there any measures or actions aimed at enhancing the Guidelines proposed after the test progress?			
28	With regard to making the Guidelines application compulsory in the EU regional railway transport, should a law and possibly other measures (standards, directives etc.) be proposed and passed in the European Parliament?			

* Note The above table represents a possible validation scenario through feedback.

** Tables 4 and 5 may be merged to form a single questionnaire but for organizational purposes they are presented separately.

7.1 Tests regarding the Berlin area

A. Particularities

The pilot application will be focused on the German legal framework used for the coordinated awarding process in the metropolitan region of Berlin-Brandenburg. The objective is to simulate how the Guidelines can support an efficient setting and process especially for energy-related tasks. The Guidelines will be simulated in a process set-up by SenStadt and TSB FAV.

The metropolitan region of Berlin-Brandenburg consists of the German capital city with a very high density, the surrounding federal state of Brandenburg with a very low density and a small, but even growing number of commuters in regional railway services.

Due to the severe financial budget situation of the city of Berlin and the federal state of Brandenburg there is the need to reduce economic risks for the public budget caused by energy-related subsidies or costs of regional railway services. Ambitious political objectives are existent in energy and greenhouse gas policy.

B. Users

- SenStadt – PTA for local and regional railway service, will perform the actual test of the Guidelines.
- KCW and TUB (support on technological and economic/legal issues)
- BAG, SPNV (national framework association for PTA’s; estimation of cost effect by inclusion of environmental requirements)
- MIR (Brandenburg Ministry for Transport; support on specific matters concerning the German procurement)
- DB Regio or S-Bahn, Berlin, operator (feedback and information on specific elements of the tests)

C. Results and impact

The Berlin pilot site expects learning effects on how an efficient process can be implemented in terms of energy-related objectives:

- Effect on energy- and cost-savings in the phase of operation

- What are the costs for the respective service?
Risks for public budget, subsidies, etc by raising energy prices
- Which Greenhouse Gas Emissions will be caused by the operation?
- Low risk of operation problems in case of economic problems of the operator, caused by over-ambitious energy/ecologic standards
- Risk of contract failure in case of conflicts between the contract details and awarding

D. Proposed activities and technical test details

The pilot applications in Berlin will cover connections issued for awarding: Regional Express 74, 75, 76

Train Kilometers:

- Total 12.500.000 km
 - thereof 2,800,000 km in Berlin
 - thereof 9,700,000 km in Brandenburg

Share of diesel traction: Lines RE 76, 1,500,000 train km

Vmax: 160 km/h, Diesel 120 km/h

Contract period: 12 years

Start of operation: December 2014

Number of vehicles:

Electric traction: Double deck EMU or locomotive-hauled double deck trains – ca. 190 coaches

Diesel traction: Two-car DMUs or the respective number of coaches (one-level)

E. Test conclusions

The protocols drawn up upon test completion shall include, besides conclusions of the performers of each application, a self-evaluation of the compliance of the results obtained with ECORailS based on filling in a questionnaire.

7.2 Tests regarding the Øresund area

A. Particularities

B. Users

- Trafikstyrelsen, Copenhagen, Danish PTA – will perform the actual test of the Guidelines.
- Macroplan, Copenhagen (support on technical issues)
- TFK, Borlange, (estimation of cost effect by inclusion of environmental requirements)
- Skånetrafiken, Malmo, Swedish PTA (support to Trafikstyrelsen on specific matters concerning the Swedish procurement).
- DSBFirst, Malmo, operator (feedback and information on specific elements of the test)

C. Results and impact

D. Proposed activities and technical test details

E. Test conclusions

The protocols drawn up upon test completion shall include, besides conclusions of the performers of each application, a self-evaluation of the compliance of the results obtained with ECORailS based on filling in a questionnaire.

7.3 Tests regarding the Brescia area

A. Particularities

B. Users

- Region Lombardy, Province of Brescia, Bergamo, Mantova and Cremona
- Region Lombardy, FNM, Province of Brescia

C. Results and impact

D. Proposed activities and technical test details

E. Test conclusions.

The protocols drawn up upon test completion shall include, besides conclusions of the performers of each application, a self-evaluation of the compliance of the results obtained with ECORailS based on filling in a questionnaire

7.4 Tests regarding the Timisoara area

A. Particularities

The test scope is the simulation of the awarding process for rail vehicles based on the Guidelines developed within the project. In this context the specific objectives are:

1. Testing the inclusion of the indicators in the awarding process
2. Demonstrating the applicability of the Guidelines in real conditions
3. Verifying the achievement of the ECORailS objectives
4. Documentation regarding the tests and test results

The regional characteristics are presented in Annex I of the Grant Agreement

B. Users

- Regional Rail Passenger Transport Timisoara (RTFC - Timisoara) Romania – TOC
- Integral Consulting R&D Bucharest Romania – Technical support and Coordinator
- National Society for Passenger Rail Transport. – PTA
- Other stakeholders involved in the regional rail transport

D. Results and impact

It is estimated that the test results will allow for the verification of the indicators and instructions elaborated in the Guidelines.

Several activities are being checked:

- 1 Awarding texts serving as examples for energy efficient and sustainable awarding
- 1 Test report which must also contain the following fundamental issues:
 - Awarding documents
 - Whether the documentation is new or modified according to ECORailS objectives
 - Description of the test methodology
 - Indicator calculation methodology
 - The evaluation of the offers according to the ECORailS objectives

E. Proposed activities and technical test details

Preliminary studies have shown two main parts of the regional rail network which are of particular interest:

- between Timișoara and smaller cities Lugoj, Caransebeș, Reșița

- between Arad and Deva, Simeria, Oradea și Brad

The necessary materials to be acquired are:

- 10 DMU
- 10 EMU

The technical characteristics were already estimated (Annex 1 Description of the action) but these are prone to change/ completion / modification according to the indicators and technologies proposed in the Guidelines.

F. Test conclusions

The protocols drawn up upon test completion shall include, besides conclusions of the performers of each application, a self-evaluation of the compliance of the results obtained with ECORailS based on filling in a questionnaire

7.5 Evaluation and validation from the perspective of the tests in the four areas.

Taking into account the specific comments and conclusions and general WP4 conclusions, the EU wide applicability of the test results will be assessed.

In this regard we aim to compile the conclusions specific to each of the tests conducted in the areas Berlin, Øresund, Brescia and Timișoara with the independent evaluation and validation conclusions resulted in WP5.

Table 6 – Joint requirements for pilot applications evaluation and validation

Joint requirements for each of the 4 pilot applications (Timisoara, Brescia, Berlin and Øresund)	Modalities and test validation instruments, according to ECORailS objectives
Evaluation of the costs and economic benefits estimated for the new types of regional rail transport vehicles and services to be awarded by applying the Guidelines, as compared to those awarded based on current award documentation.	Performance Indicators Level 1
Evaluation of the environmental benefits estimated for the new types of regional rail transport vehicles and services proposed, awarded by applying the Guidelines, as compared to the existing ones.	
Evaluation of the estimated energy efficiency benefits for enhancing railway energetic energy by 2020 by using the new types of services or means of transport proposed procured by applying the Guidelines, as compared to the current ones.	
Workshop with the Administrations and the User Platform members in order to initiate them in the modality of elaborating and applying the Guidelines, as well as to get them acquainted with the test results.	Evaluation of the degree of interest and participation of those involved in the awardings, in the test activities and in promoting the Guidelines application. Level 2 Level 3
Evaluating the TOCs and PTAs intentions of applying the Guidelines in the future awardings and the Guidelines degree of usefulness	Evaluation of the degree of usefulness and ease in applying the Guidelines for the factors involved in award processes Level 2

Based on the results and conclusions of the independent evaluation and validation processes of the pilot applications, WP 5 final conclusions and, concurrently, the proposals intended for carrying out the Guidelines final instructions will be defined. WP5 will also make recommendations to WP4 on integrating the test conclusions and on the synthesis of the recommendations for the elaboration of D14: "Report on pilot applications" (Month 22). Deliverable D14 is fundamental for the evaluator and should provide aggregate results and an objective synthesis of the reports of each test region, so that a balanced analysis of the Guidelines performance may be made.

8. Conclusions

8.1. Conclusions referring to the validation strategy.

The elements pointed out in the documents from the previous chapters were aimed at defining the evaluation/ validation methodology for the whole EOCRailS project and the necessary instruments and requirements for the performance of the evaluation/ validation activities.

From the very start, it was considered that several distinctions concerning different approaches and semantics/ terms should be made.

In this context, a clear distinction was made between the verification, analysis, evaluation and validation notions, respectively. The evaluation was aimed at examining all the project results, from a quantitative and qualitative point of view, with a stress on their compliance with the initial requirements and with ECORailS project objectives. This activity has been running since the early stages of each action, when the first variants of the documents were analyzed, and, based on WP5 suggestions, a continuous improving process of Deliverables up to their final form, is to take place. From this perspective, we have had in view the adoption of the best solutions and proposals for improving/ completing the documents to be elaborated, so that in the final stage, their validation is made possible. The last stage is taken when the documents subject to the analyses totally fit the aim of the project, otherwise additional corrective steps being required.

The approach to the evaluation/ validation processes shall be in keeping with Annex I of the Grant Agreement at three levels.

First, the strategy aims at supervising/ evaluating the compliance of all the Deliverables with the project objectives. Secondly, the strategy aims at testing/ evaluating the Guidelines performance, based on the pilot applications conducted in the four locations.

The three analysis levels are the quantitative (reaching the targets increased energy efficiency and CO₂ emissions reductions), the qualitative (pointing out the level of adaptability, efficiency and acceptability of the Guidelines) and the result dissemination (the quantitative indicators and the feedback, respectively, should confirm the successful integration of the energy efficiency and environmental criteria into the awarding procedures for regional rail transport vehicles and services).

The evaluation strategy is aimed at highlighting the work premises (objectives, information sources, terminology etc.), the methodologies approached (for the three analysis levels) and the pilot application evaluation/ validation procedures to be implemented.

Two big categories of activities have been distinguished for the whole process:

- Result evaluation on a scientific base – indicator calculation, technical and economic analysis etc.
- Result evaluation based on users' and stakeholders' feedback and surveys of opinions – by completing and analyzing the data in questionnaires, standardized forms, or by collecting opinions from various sources (e.g. User Platform Meetings)

These types of activities shall be developed both combined, as in the case of the quantitative analysis (Level 1) and separately, in the case of the analysis referring to manageability and dissemination (Levels 2 and 3).

8.2. Conclusions related to cooperation.

WP5 participates in the project activities WP2, WP3, WP4 and WP6, in permanent collaboration with other WPs, collecting material from these WPs to make the necessary proposals from the validation perspective, as well as to create the data basis and the know-how underlying the validation strategy elaboration.

At the end of the strategy, the conclusion that was reached is that in order for the evaluation and validation activities to succeed, a strong collaboration with the other partners involved in the project is necessary, for supplying the necessary data (qualitative and quantitative) in a timely manner and at the levels demanded by WP5.

In the contrary case, this important activity of the ECORailS project could be realised under non optimal conditions or even compromised, which would lead to not finalizing the project in the terms and conditions initially established.

The strategy offers the premise to fulfill the project's goals:

- Making recommendations so that the Guidelines become a real support tool for decision makers within PTAs, TOCs, IMs in order to select for the awarding process the technologies that contribute to an increase in energy efficiency and CO₂ emissions reduction
- Developing a competitive environment for regional railway awarding that aim to improve energy efficiency, reduce life cycle costs and reduce CO₂ emissions
- Improving the competition between rolling stock suppliers that will lead to further improvements in energy efficient technologies in order to cope with the new awarding criteria

An important aspect refers to one of the most important characteristics and advantages of the ECORailS project – the project isn't conceived as a laboratory project within which the result will be shown at the end, instead it is thought as a project within which the works performed by the 15 partners are constantly brought up to knowledge (through dissemination) and discussed (workshops, Users Platform, Training Modules, etc.) with all the stakeholders (PTAs, TOCs, IMs, suppliers, stakeholders, European or professional organizations). The entire development of ECORailS project is based on the permanent adaptation according to the stakeholders' feedback and requests.

For this reason, their point of view is highly useful even after the dissemination of this deliverable.

Even after the project has been finished, the users represent the decisive factors which have to attain the most important effect, respectively using in practice the awarding procedure according to the new energy and environmental criteria for all the services and rolling stock that will be purchased.