

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

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ECORails

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Project Fact Sheet

Energy efficiency and environmental criteria in the awarding of regional rail transport vehicles and services (ECORails)

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Benefits (max. 150 characters incl. space):

- Increase of the procurement quality with environmental requirements, thereby extend the awareness for “green” technologies and strategies in the regional rail transport
- Creation of a European expert community and discussion process concerning environmental standards in regional rail transport to create a sector wide know-how transfer
- Commitment of PTAs of the relevant Member States to an anticipatory strategy of procurement and awarding

Keywords: Regional Rail Transport, Awarding, Environmental Performance

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Summary

The EU project ECORails (duration 2009-2011) aims to the inclusion of environmental criteria by Public Transport Administrations for Regional Rail Passenger Transport. The project elaborates Guidelines as decision support for the involvement of energy efficiency improvements, as well as emission reductions in regional awarding. The Guidelines will include as follows:

- Set of environmental criteria for services, rolling stock, and infrastructure management, basing on results of previous technology projects as e. g. Railenergy, PROSPER, and national activities

- Legally compliant text modules useable by Public Transport Administrations (PTA's) for regional awarding in all 27 EU member states
- Test of the guidelines in four regional sites exemplary for the different European starting points (Berlin-Brandenburg, Øresund, Lombardy, Timisoara)

The Consortium consists of 15 partners, including four PTA's from six European countries (DE, DK, SE, IT, RO, HU). It is coordinated by TSB-FAV.

Background

The railway is one of the most environment-friendly means of passenger transport. This is due to inherent advantages of rail services and technologies. Modal shift towards rail transport can be an appropriate measure for reducing energy consumption, CO₂ emissions, pollutants and noise. However, the competing modes, especially private cars and buses, have improved their environmental performance substantially in recent years while the railways have not yet realised all their energy-efficiency and environmental potentials. Further improvement is crucial for the railways in order to contribute to a more sustainable future.

In most European countries, regional rail services are today coordinated by regional or national Public Transport Administrations (PTAs) which usually organise train services by Public Service Contracts (PSC). These contracts define the extent and the quality of services as well as the price the PTA has to pay to the contracted Train Operating Company (TOC).

Although a lot of PTAs already have their experiences with quality criteria, green criteria have their own challenges and political background. Therefore the ECORailS consortium elaborates Guidelines for PTAs as a decision support for legally secure tendering and procurement including energy and environmental criteria. They are evaluated by PTAs and stakeholder groups in four regions exemplary for the different European starting situations (Berlin-Brandenburg, Oresund, Lombardy, and Timisoara) and an European advisory board (ECORailS User Platform).

Expected results

ECORailS targets to three performance levels, which are related to the energy savings and CO₂ reductions achievable by the Guidelines (Level 1 "quantitative energy and emission savings"), the acceptance and usability of the Guidelines by administrative decision-makers and stakeholders (Level 2 "manageability of the Guidelines"), as well as an extended dissemination (Level 3 "Scope of dissemination"):

Level 1 – Quantitative energy and emission savings:

- Improvement of energy efficiency
 - 5% in comparison to current awarding
 - 10% with regard to the currently used rolling stock
 - In the long term: System-wide improvement of energy efficiency for regional railway by 15% by 2020
- Reduction of CO₂ emissions
 - 5% in comparison to current awarding and
 - 10% with regard to the currently used rolling stock
 - In the long term: System-wide reduction of CO₂ for regional railway by 15% by 2020

Level 2 – Manageability of the guidelines:

- 4 Agreements on the energy efficiency and CO₂ targets
- 12 interviews/written questionnaires with PTAs/TOCs from at least 6 countries

Level 3 – Scope of dissemination:

- Number of administrations/companies participating in the User Platform: 10 PTA's and 10 TOC's from at least 5 different countries
- Number of administrations/companies participating in at least one of the dissemination events: 20 PTA's and 20 TOC's from at least 8 different countries; at least 5 vehicle suppliers
- 4 agreements with PTA's on the energy efficiency and CO₂ targets

Achieved results

ECORails provides decision support for the inclusion of energy and environmental criteria by Public Transport Administrations in the awarding of regional rail technologies and services. The project elaborated Guidelines which describe options for the involvement of energy efficiency improvements, noise and Green House Gases/exhaust gas reductions under the different technological, economical and political frameworks for awarding in the European regions. Parts of the Guidelines are a catalogue of energy efficient technologies and operational measures, as well as text modules for integrating energy and environmental criteria into the different European tendering and procurement processes.

ECORails has made achievements on three performance levels, which are related to energy and CO₂ reductions made possible by the Guidelines (Level 1 “quantitative energy and emission savings”), the usability and acceptance of the Guidelines by administrative decision-makers and key stakeholders (Level 2 “manageability of the Guidelines”), as well as an extended dissemination of the environmental potentials given by regional rail awarding (Level 3 “Scope of dissemination”).

The performance has been proven by pilot applications of the Guidelines in the four regions Berlin-Brandenburg, Øresund, Lombardy and Timisoara together with the local administrations as well as Train Operating Companies, Infrastructure Managers, and Suppliers as the key stakeholders of regional railways.

Level 1: Quantitative energy and emission savings

Result and Impact Indicators:	Target (quantification) of success:
Quantitative energy and emission savings:	
Improvement of energy efficiency using two of the Key Performance Indicators from the Railenergy ¹ project: <ul style="list-style-type: none"> ▪ Final energy consumption (kWh or L diesel) per seatkm or ▪ Final energy consumption (kWh or L diesel) per person-km (pkm) 	With the guidelines the following objectives will be considered: <ul style="list-style-type: none"> • 5% in comparison to current awarding • 10% with regard to the currently used rolling stock • System-wide improvement of energy efficiency for regional railway by 15% by 2020 ▪
Reduction of CO ₂ emissions using one of the Key Performance Indicator from the Railenergy ¹ project: <ul style="list-style-type: none"> ▪ Primary energy consumption per seat-km or person-km (pkm) combined with electricity mix (EU statistics) leads to this CO₂ indicator: ▪ CO₂ emission (gram) per seat km or per person km 	With the guidelines the following objectives will be considered: <ul style="list-style-type: none"> • 5% in comparison to current awarding • 10% with regard to the currently used rolling stock • System-wide reduction of CO₂ for regional railway by 15% by 2020

Energy performance data are more and more captured during train operations. However, the respective information is only comparable because no sector-wide required performance indicators have been agreed; therefore the measured data formats are different. Furthermore, the use of on-board measurement is not standard, so that energy meters are not used in all countries or operations. The Result and Impact Indicators described above are Key Performance Indicators defined by the Technical Recommendation “Specification and verification of energy consumption for railway rolling stock” of UIC and UNIFE, which have been an outcome of the Railenergy project in 2009. For the pilot applications and the assessment of energy baselines and performances, the consortium partners agreed on different fallback scenarios in case that operational data along with the used Indicators are not available. The scenarios allow aggregating the respective data to the Indicator level:

¹ The indicator methodology from the Railenergy project (EU FP6 integrated project (www.railenergy.org) is in line with the UIC leaflet 330 “Environment Performance Indicators” (published August 2008).

1. **Operational data measured by the defined indicators**
2. **1st fallback plan:** Sector-wide accepted standard profiles (from Railenergy) for simulating the energy performance
3. **2nd fallback plan:** Average data for electric or diesel operated regional trains provided by technical functionality information
4. **3rd fallback plan:** Sum of energy consumption per train-km for all electric / diesel operated lines of an established service contract

Included in this approach will be the consideration of different energy mixes for operating and parked trains, as the underlying energy mix for parked trains can differ from the mix for operating trains.

The results for the four test sites have shown the following energy performance and CO2 reduction:

TEST REGION TOPIC	BERLIN	TIMISOARA	ØRESUND	LOMBARDY
Compared to current awarding	up to 9 %	10.5 %	12.9 %	8 % - 10 %
Compared to currently used rolling stock	evaluated during the workshop process with the stakeholders	15.6 %	no change of rolling stock in the pilot	no change of rolling stock in the pilot (10% monitored)
At system level	evaluated during the workshop process with the stakeholders	27.56 %	15% reachable with additional investments	15 % reachable by implementing the agreed mid-term plan

Level 2: Manageability of the guidelines

Result and Impact Indicators:	Target (quantification) of success:
Manageability of the guidelines (Germany, Denmark, Italy, Romania, Hungary):	
Acceptability and participation: <ul style="list-style-type: none"> ▪ Acceptance by the users of the guidelines ▪ Efficiency for decision-making 	4 Agreements on the energy efficiency and CO2 targets 12 interviews/written questionnaires with PTAs/TOCs from at least 6 countries

Basing on an interview questionnaire available in M2, 30th of June 2009, the ECORailS consortium made 12 interviews with PTA's, TOC's, and PTA consulting companies on expectations and benefits and on quality criteria in regional rail transport. Furthermore, within Work Package 5 the implementation of the expectations/benefits and the quality criteria have been validated with regard to the manageability of the Guidelines, based on the Result/Impact Indicators "Acceptance by the users of the guidelines" and "efficiency for decision-making".

Even if quality criteria have constituted an awarding criterion for some time now, issues related to the environment must become of central attention also. Although the railways already constitute the most environmental friendly means of transport, the other modes of transport are continuously improving their environmental performance, so in order to keep its lead the railways must follow the trend also. Moreover, with experts' prediction that 90 % of the future population growth will be concentrated in the cities, mobility is becoming the biggest challenge when it comes to ensuring sustainable growth. In the course of these developments, the demand for individual mobility will continue to soar – intensifying the need for increased transport.

In order for mobility and sustainability to go hand in hand, all actors involved in the transport sector must become environmentally conscious. The ECORailS Guidelines comes in the support of all transport market players as a tool teaching them how to adhere to the new concept of energy efficient and environmental-friendly awarding. Within the Guide, public authorities can find ways of requesting, evaluating and monitoring environmental criteria while doing it in a legally secure way. Since all considerations were written in accordance with EU27 law, it assured the usability of the Guidelines even outside the project partner countries, making it a useful tool provided small modifications or adaptations are made according to country specifics.

Because of its broad approach, the instructions from the Guideline can be followed in any type of awarding procedure specific or imposed by national law, for any type of awarding project – described functionally or solution oriented – always promoting the principles of efficiency, both economical and environmental

The Guidelines can be used as a primary source concerning the introduction of energy efficiency criteria in the awarding of rail vehicles and services, since it contains all main issues concerning these aspects. The advantage of the Guidelines is that it incorporates a lot of feedback coming from the users which signifies that key points of concern are addressed.

The Guidelines also were designed to be a practical instrument to be used in real awarding of rail vehicles and services and in this respect, it contains step by step information on how to approach the awarding process in a systemic manner. One noteworthy feature of the Guidelines is that it provides information, where available, on what changes or what the users should pay attention to when introducing EE/ ENV criteria compared to business as usual practices. This aspect should be a key point in the future use of the Guidelines.

The Guidelines contain concrete information regarding technologies and operational measures in terms of energy efficiency potential which represents a good reference source which users could use as a “quick acid test” to get an idea of the potential in their region. In addition, since the Guidelines were tested in four regions, the power of their example can serve a powerful stimulant to initiate actions to reduce energy on a regional level via awarding.

The Guidelines contain useful information regarding LCC driven procurement and the importance of an LCC approach in the awarding of vehicles and services. Within the Guidelines, a direct link between energy efficiency and economical efficiency (which is a point of interest for all stakeholders) is drawn as a strong convincing point is concerning the advantages of saving energy. This should be one of the focuses of further promoting the Guidelines since all users face budget issues.

Furthermore, four agreements on the energy efficiency and CO2 targets have been concluded at the four regional sites.

Level 3: Scope of dissemination

Result and Impact Indicators:	Target (quantification) of success:
Scope of dissemination (Germany, Denmark, Italy, Romania, Hungary):	
Number of PTA and TOC participating in the User Platform:	20 PTA and 15 TOC from at least 6 different countries
Administrations/companies participating in at least one of the dissemination events:	25 PTAs and 25 TOCs from at least 10 different countries; at least 8 vehicle suppliers

The acceptance of using energy and environmental criteria has been addressed in ECORailS by the involvement of the target groups and key actors into several testing and dissemination activities. Core of these activities was the advisory board “ECORailS User Platform”, which was organised at a European and a regional level. The European meetings served for the identification of Europe-wide relevant expectations, needs and requirements of the stakeholders. Due to the success in involving national and regional Train Operating Companies, Infrastructure Managers and Suppliers into the Platform activities, a regional level has been established (the “Site Stakeholder Groups”) which tested the Guidelines in the frame of WP4.

Secondly, the User Platform acted as a dissemination board. Therefore the number of participants has been counted regarding the (quantification) of success both for the User Platform and for the dissemination events. Additionally, the interviews made with the stakeholders have been included additionally as dissemination events, as they were accompanied by an introduction of the project activities and objectives. Finally, with regard to external activities presentations and papers for conferences, scientific journals, and newsletter have been undertaken.

Altogether the following numbers could be already achieved:

- User Platform: 20 PTAs and 15 TOCs/IMs from 6 different countries
- Dissemination events: 27 PTAs and 17 TOCs/IMs from 9 different countries; 14 vehicle suppliers