The Guidelines in a glance

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Concept of the Guidelines

• Enable PTAs to make good strategic decisions on service, timetable and operations in terms of energy efficiency

• Extend awareness for “green” technologies and information on ecology-oriented strategies for procurement

• Provide detailed specification of energy efficiency and environmental matters for rolling stock and services related to regional passenger rail transport

• Provide standardised methods but not invent own standards competing with UIC 345 or TECREC 100 001
Concept of the Guidelines

- Enable PTAs to make good strategic decisions on service, timetable and operations in terms of energy efficiency
- Extend awareness for “green” technologies and information on ecology-oriented strategies for procurement
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Guideline structure

In the final version, the structure will be focused on target groups and divided into two parts:

I. WHY to include EE/ENV criteria
   1. Introduction
   2. Political considerations
   3. Legal framework

II. HOW to include EE/ENV criteria
   4. Contracting and awarding with EE/ENV issues
   5. Application of EE/ENV criteria and specifications

Legal Annex
Technical Annex (not printed)
Annex text modules (not printed)
Strategic considerations (chapter 2.3.1)

(1) Overall transport policy including targets
(2) Clear financial relations between government and TOC; sufficient duration of contracts
(3) Quality of infrastructure
(4) Quality of energy supply infrastructure
(5) Electrification
(6) Timetable
(7) Integrated strategy for noise protection
(8) Fleet strategy (new/old/modernised)
How to trigger the innovation process

The timeframe of tendering is often too short for making substantial steps forward in innovation. It should be embedded in a more comprehensive innovation strategy (chapter 2.3.2):

1. Clear environmental strategy
2. Coordinated action with other PTAs
3. Stimulation instead of binding requirements
4. „Postponed“ requirements
5. Incentives for later modernisation
6. Modernisation paths
Issues when defining a concrete award project (chapter 4.1)

- Identification of lines or networks; definition of lots
- Timetable and service concepts
- Identification of main environmental problems
- Analysis of energy prices, charging and supply system
- Analysis of the actual situation in terms of energy consumption and CO2 emissions
Issues when defining a concrete award project
(chapter 4.1)

• Draft definition of targets in terms of energy efficiency
  (pollutants, noise)
• New, refurbished or existing rolling stock?
• Vehicle concept and comfort for passengers
• Locations for parked trains and maintenance facilities
Basic decisions of PTAs which could influence energy efficiency and environmental performance of rail passenger services (chapter 2.3 GL)

- Quality of infrastructure (tracks, level crossings, management of operations)
- Integral Regular Timetable
- Buffer time in the timetable
- Stops on request
- Weakening and strengthening of trains
- Avoiding of empty running trains
- Vehicle concept
- Electrification
- Diesel under wire
# Overview of criteria

<table>
<thead>
<tr>
<th>Performance indicators</th>
<th>Indirect indicator</th>
<th>Parked train mode</th>
<th>Technologies</th>
<th>operational measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>kWh per • pass. km • seat km • train km • gross tkm</td>
<td>mass per seat</td>
<td>comfort functions</td>
<td>most prominent • braking energy / onboard equipment • braking energy / fixed installations (sub-stations, supercaps) • braking energy / diesel operations</td>
<td>most prominent • energy-efficient driving (timetable, training, technical advices)</td>
</tr>
</tbody>
</table>

- Traction energy consumption
- • assessment of risks and costs (LCC, CBA)
- • state of the art
- • availability on the market
- • future availability on the market

- Evaluation of vehicles?
- Evaluation of operations?
- Estimation of standard energy costs

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Instruments

- Requirements
- Weighting and scoring
- Penalties (if a defined quality is not realised during the contract duration)
- Incentives (bonus/malus) for good performance or improvements during the contract period
How to include in award procedure (rolling stock)

1) Analyse the data situation

2) Decide whether new vehicles will be required or existing ones will be accepted
   In the latter case: Decide about consumption levels or technological standards to be accepted

3) Decide upon instrument:
   a) Requirement; b) weighting & scoring; c) combination

4) Select the relevant indicator (e.g. kWh per seat km)

5) Define maximum/reference levels; define scoring method
How to include in award procedure (rolling stock)

6) Decide upon service profile
7) Describe selected service profile(s) according to the standardised methodology
8) Require declaration of traction energy consumption from the manufacturer → according to the defined methodology
9) Define requirements for verification
10) Integrate text modules and documents in the tender documents
Relevant indicators

- **kWh / passenger km:**
  Main overall objective but within award procedures, measures for improved occupancy and improved EE should clearly be separated from each other.

- **kWh / seat km:**
  Most relevant indicator; applicable for awarding services and procurement of vehicles; applicable for assessment of MUs, loco-hauled trains (as a whole) and for comparing MUs with loco-hauled trains.

- **kWh per train km:**
  Technical basis (in terms of measurement) for calculating kWh per seat km; in certain (very few) cases helpful to simplify the process when used as such.

- **kWh per gross tonne km:**
  The most relevant indicator for the assessment of locomotives.
Performance Indicators – challenges and restraints

- Clear definition of train configuration and interior design
- Service profiles to be clearly defined
- Clear definition of secondary conditions
- Technology for monitoring the energy consumption required (e.g. energy meters)
- Comfort functions for passengers to be analysed separately
- Parked train modes to be analysed separately
The PTA (or TOC) may define a specific service profile which
• is representative for the own network;
• can easily be used for testing.
• Relevant parameters need to be described:
  • Infrastructure
  • Diesel fuel specifications
  • Operational requirements
  • Environmental (ambient) conditions
Options for Verification

(1) Simulation by the manufacturer:
   • Reliability too limited for verification
   • Should be required for plausibility check of offers

(2) Certified documentation of test runs by the manufacturer:
   • Future availability expected with reference to SSPs
   • Independent certification compulsory

(3) Test runs under auspices of PTA
   • Compulsory for verification with reference to specific service profiles
   • On the real line or on dedicated test facilities
   • Who will bear the costs of the test campaign?
Rationale for monitoring operations

- Relevant if services are awarded (rolling stock from PTA or TOC)
- Prerequisite for
  - Political reporting about the environmental effects of the railways
  - Better calculation of reference values for future contracts
  - Identifying potentials for improvement (joint effort by PTA, TOC and Infrastructure Manager)
Rationale for monitoring operations

- Basis for incentives
  - Motivate the TOC to apply all feasible operational measures in order to save energy
  - Even modernisation may be induced in certain cases
  - Bonus/malus would be related to the performance compared to the reference value
- Methods for monitoring to be defined in tender and contract documents
Main challenges

(1) Calculating the reference value
(2) Unstable infrastructure and operation conditions
(3) Improved infrastructure and operation conditions
(4) Incentives for low energy consumption must not outweigh penalties for bad punctuality.
(5) Changes of energy supply and energy market conditions
Pollutants: Environmental law (chapter 3.1)

- regulates emission limits for CO, HC, Nox, PM
- binding for new diesel locos and DMUs
- and replacement engines
- Stage IIIA valid since 2006/2008/2009
- Stage IIIB from 2012 onwards

- EU-wide limit values for the concentration of harmful pollutants (mainly PM$_{10}$, NO$_x$, PM$_{2.5}$)
- Air quality planning
Pollutants: (chapter 5.5)

Options:

• Requiring or encouraging Stage IIIB
• Requiring or encouraging Stage IIIA
• Requiring or encouraging Stage IIIA but PM limits of IIIB
• Excluding locos and DMUs with outdated standards
• Modernisation of the fleet during the contract period
• Incentives for intensified use of better vehicles
• Maintenance quality
Noise: Environmental law

Decision 2011/229/EU of 4 April 2011 („TSI Noise“):
• Regulates emission limits for stationary, starting and passing-by noise
• Binding for new rolling stock on the Trans European Network
• → binding (or important relevance) for regional trains
• Second step envisaged for 2016/2018
• Upon refurbishment, noise emissions must not be increased

• Strategic noise maps
• Noise action planning (no targets set by END)
Noise

How to include noise criteria in the awarding procedure

1) Analyse the relevance of noise emissions on your network.
2) Analyse available data about noise emissions of relevant rolling stock.
3) Require that newly procured vehicles fulfil the emission limits of TSI Noise.
4) Decide whether stricter emission limits shall be required or encouraged.
5) If existing vehicles are going to be accepted, decide
   - which emission limits to be fulfilled;
   - noise remediation to be required and which targets to set;
   - about stimulations for modernisation or replacement
   - about incentive schemes for intensified use of silent vehicles;
   - which method of verification to be required.
6) Require documentation of type-approvals in terms of noise emission.
7) Require a monitoring system which allows for
   the application of the defined incentive system.
Ways of publication

- Printed version English: available
- Printed version German: available
- Printed versions Swedish, Danish, Hungarian, Italian, Romanian: currently being printed
- Technical Annex: Will be available for download (www.ecorails.eu)
- Annex M (text modules from the pilot applications): Will be available for download (www.ecorails.eu)
Technical Annex

• T-1: Background information on strategic issues (a.o. timetable issues)
• T-2: Additional information on instruments of awarding
• T-3: Details on technologies and operational measures
• T-4: Details on LCC and CBA application
• T-5: Additional information on pollutants
• T-6: Additional information on noise
Further relevant documents

- D 8: “Technological overview with regard to energy efficiency and environmental performance, ready to be integrated into the final Guidelines version”
- D 11: “Legal and economical input for the final Guidelines version”
- D 14: “Pilot applications”
- D 17: “Validation report including tests and recommendations”
- (WP about technologies and LCC analyses)
Contact

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If verification fails

- Set an appropriate deadline for a new verification attempt, allowing the manufacturer or TOC to apply corrective measures.
- Define a penalty for every train km or seat km which is performed by non-compliant rolling stock.
- Shorten the contract duration.
- Terminate the contract (LAST OPTION).

The appropriate action depends on:

- the degree of failure;
- the potential for (short-term) improvement;
- the bidder’s (non-)compliance with other requirements or agreements;
- the quality, price and plausibility of the competing offers;
- legal positions of the competing bidders;
- alternatives available;
- urgency of starting operation with the non-compliant rolling stock.