Study to develop tailor-made solutions for use of innovative financing to support deployment of ERTMS, in particular along nine core network corridors

Brussels, 20th January 2015
Content

1. Context of the study
2. Scope and content of the study
3. Stakeholder involvement
4. Project time plan
5. Information on the workshop
1. Context of the study

Full deployment of ERTMS on the TEN-T network is one of the priorities of the railway transport infrastructure development. The TEN-T Regulation No 1315/2013 requires the deployment of ERTMS on TEN-T core and comprehensive networks by the years 2030 and 2050, respectively.

The investment required for the deployment of ERTMS on the TEN-T core and comprehensive networks exceeds the capabilities of public funding. The CEF budget will not be sufficient to cover all the investment needs for ERTMS.

It is therefore important to complement the use of CEF or other grants with other sources of private finance to support the deployment of ERTMS.
2. Scope and content of the study

• To provide assistance to the Commission in developing market based financial solutions to complement the use of CEF grant contributions.

• To develop realistic and specific business models as well as innovative financial schemes to attract private finance to support the deployment of ERTMS, for example:
  • on the ground, through Public-Private Partnership (PPPs) structures, with the potential support of specifically adapted CEF instruments;
  • on-board, investigating how national schemes in place at MSs level could be supported through EU financial instruments and replicated in other MSs;
  • for ERTMS deployment on-board and on the ground, defining TEN-T Corridor-specific business models.

• Our study will not assess the technical merits of ERTMS or its business case and impacts.

• To engage stakeholders while producing an independent study.
3. **Stakeholder involvement (1/2)**

*Why the involvement of stakeholders is key to the success of the project*

- The aim of the study is to deliver a practical way forward in ERTMS financing
- The quality of the study depends on the information received by the industry
- Desk research can provide limited input (e.g. input on expected ERTMS deployment time-plan)...
- ...but to adequately identify market failures and potential market based solutions we need as much information as possible on concrete issues and on both positive and negative cases.
3. Stakeholder involvement (2/2)

How are stakeholders involved?

Stakeholders views and experience will be gathered through three different approaches:

- **Direct interviews** to be conducted vis-à-vis or through video/teleconferencing systems:

- **Workshops** (i.e. plenary workshops where all stakeholders are involved):
  - 20th January;
  - Final workshop to share the outcome of the study

- **Dedicated workshops** (i.e. smaller workshops organised at association level).
4. Project timeplan

- **Project end date**: September 2015.

- **Stakeholders engagement**: end November 2014 - end of April 2015.

- **Final Workshop** in September 2015
5. Information on the workshop (1/3)

Agenda of the workshop – First session

Moderator: Mr Richard Abadie – PwC

Opening remarks 14.00 - 14.40

- Opening by Mr. Stephane Ouaki - Head of CEF Unit
- Presentation of the study by Ms Roberta Odoardi - PwC
- Work plan for ERTMS: How to boost implementation in Europe by Mr Karel Vinck - European Coordinator for ERTMS

Challenges of ERTMS funding and financing: 14.40h – 16.10h

- ERTMS financing : an infrastructure manager perspective (Mrs Nicola Furness – Network Rail) Discussion
- ERTMS financing – system approach (Mr. Libor Lochman - CER) Discussion
- ERTMS deployment in practice (Mr Michal Litwin – ZNPK) Discussion

Short break: 16.15 - 16.20
5. Information on the workshop (2/3)

Agenda of the workshop – Second session

Business models and innovative proposals for ERTMS financing: 16.20 - 17.20

• “Toll Bridge Financing” for conversion of rolling stock to ERTMS (Mr Jonas Swartling – Hector Rail)
  Discussion

• Project Financing of ERTMS: Albacete-Alicante High Speed Line (Ms Doris Chevalier – Alstom & Mr Juan Audibert – EIB)
  Discussion

ERTMS track access charges: 17.20 - 17.30

• State of play (Presentation by the Isabelle Vandoorne)

Concluding remarks and next steps: 17.30 - 17.40

Mr. Stephane Ouaki - Head of CEF Unit
5. Information on the workshop (3/3)

Useful information on the workshop

Participants from the listening room are welcomed to intervene in discussions writing their questions on paper.
These will be promptly directed to the moderator of the meeting.
Please, specify your name and the organisation you represent on the paper.

Due to time constraints, discussions must be as long as 20 minutes maximum. We apologise for all the contributions to the discussions we will not be able to listen.
Participants willing to share its comments, are most welcomed to do it by writing an email to: Financing_ERTMS_workshop@it.pwc.com, specifying the name and position before the comment.
Your views will be taken into account in our study!!

After the workshop, information on the outcome of the event can be retrieved from the Commission's site.
Work Plan for ERTMS

How to boost ERTMS implementation in Europe?

Workshop on the innovative financing of ERTMS, 20 January 2015, 14:30
Karel VINCK, European ERTMS Coordinator
Breakthrough program for ERTMS 2015-2016

Key principles of the Breakthrough Program
“Users first” and not “Designers first” approach: RUs are in a competitive situation, their needs shall be better taken into account.

Running everywhere in Europe: standardised and complete, Baseline 3 (B3) on-board equipment should be able to run everywhere in Europe; infrastructure managers should ensure that this standardised on-board equipment is able to run on their network.

Focus on deployment: all stakeholders should shift from the specifications and development to deployment, operation and maintenance of the ERTMS specifications; latest set of specifications (B3 MR1) should be used to build onboard and trackside equipment.

ERTMS System Cost reduction for ERTMS solutions and products, their maintenance, for the European system as a whole. Further steps could be: harmonization of operational rules and of engineering rules, standardisation of ERTMS components and interfaces.
Breakthrough program for ERTMS 2015-2016

Identified objectives
1. A realistic and committed deployment plan

- By end 2016, a true 2030 master plan for deployment, to legally replace the current European Deployment Plan, introduced in 2009

2. Stable and mature set of specifications

- First maintenance release of the set of specifications called "Baseline 3" completed by mid-2015 (test specifications).
- Second maintenance release of the set of specifications called "Baseline 3" to be published to cover project needs and avoid national rules.
- A specifications roadmap agreed by end 2015
- Change management processes are reviewed to improve efficiency, to ensure backwards compatibility and project needs for error correction.
3. An interoperable and compliant infrastructure

- Lines are adapted to allow Baseline 3 trains to run on them. Migration and upgrade programmes are coordinated for trackside and on board. If existing lines are incompatible, corrective measures are evaluated and a plan for their implementation is made available.

- IM have the legal responsibility to provide a detailed description of their infrastructure, including ERTMS, to allow fair and non-discriminatory access to RU. This should be done by using, inter-alia, the register of infrastructure; an "interoperability map" shall be made available by end 2016 by the Rail Freight Corridors' management structures.
4. A clear and transparent regulatory framework

- The EU legal text(s)
- Quicker and cheaper authorisation procedures, supported by rigorous verification and appropriate certification and demonstration by the suppliers’ of the conformity of their products and systems, without waiting for the adoption and implementation of the 4th Railway Package
- Possible national requirements (including possible specification deficiencies), or other "requirements", if any, should be notified, collected, validated (or not) by ERA, mutually-accepted, and publicly available;

5. Facilitation of the deployment

- National and European financing and funding schemes exist, are known and are clear. Positive business cases are prepared and are communicated.
- ERTMS initiatives are consistent and effective. Communication, coordination and management principles for all these ERTMS related activities have to be formalised.
Thank you for your attention!
ERTMS Financing
– an IM perspective

By: Nicola Furness
In: EC ERTMS Financing WS
On: 2015/01/20
A. Customer Requirements
B. ERTMS System
C. Interoperability
D. Why fit ERTMS?
E. Areas impacting Cost of fitment
F. Case study: Danish ERTMS programme
A. Customer requirements
B. ERTMS System
C. Interoperability
D. Why fit ERTMS?

► Renewal
► Safety
► Interoperability
► Capacity
E. Areas impacting cost of fitment

► Specification
► Implementation
► Integration and Authorisation
► Operation and Maintenance
► Upgrade
E. Danish case study

- Old signalling equipment
- Mix of many different types and technologies
- Many failures
- Unique Danish signalling & operational rules
- Monopolistic market situation – high entry barriers
- Expensive maintenance cost
- Lack of human resources which understand old systems
- Total renewal
E. Denmark - Why total renewal?

Better prices
- Economies of scale
- International competition
- Learning curve effect

Savings on operations & safety
- Reduction in maintenance costs
- Simpler & safer operational rules
- Fewer Traffic Management sites & reduction in staff.

Quantum leap in technology
- EC standard component, redundancy of central components, higher availability
- Few safety approvals
- Few interfaces
E. Danish Tendering strategy

► Dialogue with the market for signalling
► Specify to the Market for signalling
► Discuss with the Market – bidding suppliers
► Re-specify to the Market – bidding suppliers
► All suppliers – all the way for all bids
E. Danish Programme costs

The Signalling Programme cost compares well with standardised European benchmarks

Signalling Programme and UIC case studies

- Costs include:
  - ERTMS assets incl. “incremental” GSM-R
  - testing, training & documentation
  - project management, design, engineering & certification
  - Maintenance comprises all tasks, whether provided by the supplier or by the railway undertaking, incl. 30% overhead
  - The Signalling Programme has particularly low costs for the delivery and maintenance of the trackside systems

<table>
<thead>
<tr>
<th>Index, UIC average = 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERTMS L2 trackside</td>
</tr>
<tr>
<td>58</td>
</tr>
<tr>
<td>ERTMS onboard</td>
</tr>
<tr>
<td>92</td>
</tr>
<tr>
<td>ERTMS L2 trackside</td>
</tr>
<tr>
<td>34</td>
</tr>
</tbody>
</table>

UIC, ERTMS Implementations Bench-mark, Final Report, September 2009
E. Danish Programme costs

Benchmark

Original estimate within the price range—contract prices far lower

-50% -47% -77% +8% -64% -41% -45% -37% -57%

- The prices in the contract are on average 45% lower than the benchmarks used for the original cost estimate.
- They are even lower than the lowest benchmarks observed in 2008.
- Largest and most important savings are on standard equipment like axle counters and level crossings.
- An exception are point machines, where the contract price is slightly above the original cost benchmark.

observed prices in 2008 (highest = 100)
△ benchmark used for original budget
● contract price (avg 4 lowest bids)

<table>
<thead>
<tr>
<th>central IL</th>
<th>RBC</th>
<th>axle counters</th>
<th>point machines</th>
<th>level crossings</th>
<th>balises</th>
<th>cables</th>
<th>cable ducts</th>
<th>onboard</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>90</td>
<td>70</td>
<td>60</td>
<td>50</td>
<td>40</td>
<td>30</td>
<td>20</td>
<td>10</td>
</tr>
</tbody>
</table>
Conclusion

Successful ERTMS deployment needs a financing mechanism that...

► can deal with system change

► supports the system through its lifetime

► recognises that ERTMS means deployment across track and train in a fragmented sector

► enables the stability of the specifications
Thank you for your attention
Case study ÖBB: ERTMS Infrastructure - Status Quo

ETCS Level 1
ETCS Level 2
ETCS Level 2
Existing Lines
ETCS - Upgrading of existing lines based on migration plan

in operation 10/2013: Ø 35 trains / day SRS 2.3.0d
in operation 12/2012: Ø 180 trains / day SRS 2.3.0d
in operation 10/2014: Ø 45 trains / day SRS 2.3.0d

in operation 12/2012: Ø 170 trains / day SRS 2.3.0d
in operation 12/2013: Ø 140 trains / day SRS 2.3.0d
out of operation (former pilot project): SRS 2.2.2

All Lines: Mixed Traffic - Freight and Passenger Trains
All ERTMS Lines are equipped with conventional CCS (except new lines)
Case study ÖBB: ETCS onboard deployment project 2011-2014

<table>
<thead>
<tr>
<th>type</th>
<th>vehicles</th>
<th>operation in</th>
<th>first operation</th>
<th>total direct costs</th>
<th>funding rate (nat+TEN)</th>
<th>direct costs per loco/unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1016/1116</td>
<td>332</td>
<td>AT-DE-HU-CH</td>
<td>2000-2005</td>
<td>65,1 Mio. €</td>
<td>33%+8%</td>
<td>196.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RO-BG-SK-HR(-CZ)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1216</td>
<td>50</td>
<td>AT-DE-SI-IT-CZ</td>
<td>2006-2008</td>
<td>14,3 Mio. €</td>
<td>34%+8%</td>
<td>286.000</td>
</tr>
<tr>
<td>8090 railjet</td>
<td>51</td>
<td>AT-DE-HU-CH-CZ</td>
<td>2006-2012</td>
<td>12,5 Mio. €</td>
<td>-</td>
<td>245.000</td>
</tr>
<tr>
<td>yellow fleet</td>
<td>16</td>
<td>AT</td>
<td>1989-2012</td>
<td>5,3 Mio. €</td>
<td>-</td>
<td>331.000</td>
</tr>
</tbody>
</table>

RETOFIT PROJECT:
449 existing vehicles with ETCS Level 2 (and Level 1) in 2011-2014 for about 100 M€ (direct costs only)

2015-2017:
65 new EMU ordered with ETCS level 2
Case study ÖBB: Important challenges to face

**RETROFIT PROJECT TIME LINE**

<table>
<thead>
<tr>
<th>Year</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>User Requirements Specification</td>
</tr>
<tr>
<td>2009</td>
<td>Tenders / contract</td>
</tr>
<tr>
<td>2010</td>
<td>Prototype</td>
</tr>
<tr>
<td>2011</td>
<td>Start of serial fitting</td>
</tr>
<tr>
<td>2012</td>
<td>Authorisations</td>
</tr>
</tbody>
</table>

**ÖBB Experience in Operation**

*Status 01/01/2015*

<table>
<thead>
<tr>
<th>Level</th>
<th>Integrator</th>
<th>Distance (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level1</td>
<td>Thales/Siemens</td>
<td>3,900,000</td>
</tr>
<tr>
<td>Level2</td>
<td>RBC Thales</td>
<td>15,700,000</td>
</tr>
<tr>
<td>Level2</td>
<td>RBC Siemens</td>
<td>200,000</td>
</tr>
</tbody>
</table>

**MAJOR CHALLENGES**

**Engineering**: integration in already complex existing trains

**Authorisation**: interfaces with NSAs for first and subsequent authorisations in a changing EU environment

**Industrial**: many retrofits in a short time frame and in parallel with the authorisation process; lack of technical interoperability of certain parts

**Organisation**: Collaboration of all ETCS projects (Trackside, Onboard, GSM-R, Operations)
General issues: A broad picture to be addressed

- CEF and state aid uncertainty & availability for business case?
- Availability of mature and interoperable solution?
- Losses / benefits for operators and customers?
- Massive initial investment without short or medium term benefit (if any)?
- Discrimination for RUs operating across the borders?
- Secure investment of First Movers?

MRCE comparison of ATP cost
Retrofitting a train: different impact depending on the market segment

As long as benefits are missing, retrofitting is hardly affordable for freight operators. The high number of locomotive types increase the complexity of retrofitting program.

It can be difficult to convince public authority to support ERTMS investment for PSO.

There are many uncertainties to build business cases for retrofitting passenger trains.

Financing instruments can support projects but there are many other gaps to resolve.
Way forward

All instruments identified so far in the study so far internalise all ERTMS cost.

- The study should cover the effect of financial instrument on intermodal competition.

New approach should be found:

- Financial instrument may support manufacturers’ offer
- Dedicated instrument for RUs (and not at MS or line level) should be analysed
- Difference between MSs should be investigated while avoiding any discrimination between the RUs
- Innovative financing could also facilitate cooperation model and create opportunities for joint purchasing.
Libor LOCHMAN
Executive director
Tel: +32 (0)2 213 08 72
E-mail: libor.lochman@cer.be

For regular updates on CER activities, visit our website: www.cer.be or follow @CER_railways
ERTMS deployment in practice

Perception of ERTMS at an EU-level
in comparison to
how it is viewed by freight railway operators in Poland

Michał Litwin
Federation of Independent Rail Operators - Secretary General
European Rail Freight Association - Representative

WORKSHOP ON THE INNOVATIVE FINANCING OF ERTMS
Brussels, 20 January 2015
Poland in European transport system:

- **Central location in Europe:**
  - I corridor (Helsinki – Ryga – Warsaw)
  - II corridor (Berlin – Warsaw – Briest – Moscow – Nizhny Novgorod)
  - VI corridor (Gdańsk – Katowice – Žilina/Brno)

- **EU`s border with:**
  - Russia
  - Belarus
  - Ukraine

- **Second rail freight market in Europe**
What ERTMS is thought to be:

- Big pan-European vision
- One single interoperable system
- Easier and cheaper operations
- Reduce barriers by homogenising signalling systems
- Improve safety

How ERTMS is perceived:

- “Something I have to fit additionally in my loco, pay for that and I don’t know is it what for”
- “Additional authorisation procedures horror”
- “I won’t enter some lines if I don’t have it”
- “Why so expensive?”
- “How do I train my drivers and keep them competent?”
What ERTMS is thought to be:
Official Deployment PL plan (2007)

How ERTMS is perceived:
Result (2015)

For efficient planning operators need to know in advance
What ERTMS is thought to be:

- Top EU priority
- In „White Book” mentioned
- Coordinator appointed
- Deployment Plans adopted
- EU-funding support available
- Differentiated Track Access Charges (DTAC) almost adopted

How ERTMS is perceived:

- Not a government priority in Poland and no 85% co-financing (allowed by EU for Cohesion Countries)
- DTAC limited only to ERTMS Corridors (5% of network, not fully fitted yet)
- Delays in trackside deployment of app. 90%
Usefulness

What ERTMS is thought to be:

Single, European system:
- Lower costs
- Increasing capacity
- Wider access
- Easier cross-border
- Greater competition

How ERTMS is perceived:

Superposition (additional system):
- Higher costs (two systems)
- Additional costs
  - Signalling costs on RUs (cab. sig.)
  - Staff training
  - Additional risk
- Exclusion from routes (e.g. freight from “intercity” lines)
- On-going concerns over compatibility between suppliers
Benefits/Costs

What ERTMS is thought to be:

**Long term possible benefits:**
- Capacity (only if level 3 deployed)
- IM savings on maintenance/renewals of signal system and signallers
- Competition between different suppliers drives down cost and increases innovation

How ERTMS is perceived:

**Short-term costs:**
- Over €200K per loco for fitment alone
- Availability of locos during fitment
- Maintenance (additional staff, additional time)
- Staff training (staff out of work)
- On-going software/hardware upgrades
- Transfer of risk from IM to Operator

No business case for freight operators (and customers)
Conclusions

- Implementation meets serious problems
- Business case for ERTMS is wholly with IMs
- Risk of creating new barriers instead of building true interoperability
- Treats of operators are not solved

Recommendations

- Operators do not have to bear the fitting trains cost not other ancillary costs (e.g. hardware and software upgrades, drivers training, etc.)
- Concistent deployment strategy (national and EU), operators need to know in advance
- Assuring stability of standard, no constant upgrades
- Holistic approach to funding track and train
Recommendations

Costs and funding
- Operators do not have to bear the fitting trains not other ancillary costs (e.g. hardware and software upgrades, drivers training, etc.)
- Holistic approach to funding track and train
- Equal access to funding for incumbent and independent operators

Deployment strategy
- Consistent deployment strategy (national and EU)
- Operators need to know in advance

Imperoperability
- Stability of standard, no constant upgrades
- Should eliminate barriers, not create new ones

Access charges differentiation
- Incentives for whole network, not just „ERTMS Corridors”
Thank you for attention

Michał Litwin

mail: Michal.Litwin@znpk.org
mob: +48 515 00 44 18

WORKSHOP ON THE INNOVATIVE FINANCING OF ERTMS
Brussels, 20 January 2015
“Toll Bridge Financing” for conversion of rolling stock to ERTMS

Brussels, January 20, 2015
Purpose of “TBF”:
Minimize negative impact of conversion

- ERTMS will probably strengthen rail’s competitiveness but only after compatible versions are implemented across Member States - not before

- During introduction, ERTMS conversion costs will, however, weaken rail’s competitiveness, particularly if improved financing is not created

- Thus, more effective financing such as “TBF” should be evaluated
Opportunity for improved financing

- Rail faces high conversion costs when Member States introduce ERTMS level 2
  - Adds costs of 10% - >100% to locomotives
  - Total infrastructure charges will not be reduced
  - Customers are not willing to pay more with ERTMS
  - New rolling stock (factory equipped with ERTMS) and road competition will not allow for higher prices
- **Without** a financing solution, costs will become particularly high since they must be financed by equity by each company
  - Without higher income, investments don’t merit increased debt
- **With** a national conversion program, financing costs may be dramatically reduced by allowing use of long term, low cost debt
  - Even without state guarantees
“TBF” structure

RSOs
Operators
Infrastr. mgr.

Gives directive

RSoS
Operators
Infrastr. mgr.

Administer payments (grant for 90% of conversion costs)

Syndicated loan

“Equity” contribution

Special Purpose Entity

INIA

“Toll” payment:
Typically 0.1 €/km, equivalent to approx 10% if infra charges or 1% of Opex

Repayment
“TBF” principles

• Make the beneficiaries of ERTMS in a country pay for the cost to convert to ERTMS in that country
  – (i.e. all future beneficiaries of the “Toll Bridge” pay for the “Toll Bridge”)

• Minimize the costs by smart debt financing

• Avoid state guarantees and state aid to the rail sector
Benefits of “TBF”

- Minimizes negative effects of conversion costs
  - Minimizes costs and spreads them out until benefits of ERTMS appear
- Is fair and logical
  - Minimizes the negative impact on current RSOs
  - Instead makes the beneficiaries of ERTMS pay for the conversion costs
- Avoids discrimination; all pay equal
  - small vs. large RSOs/RUs
  - current vs. future RSOs/RUs
  - public vs. private RSOs/RUs
  - subsidized vs. unsubsidized RSOs/RUs
- Increases leverage of EU/CEF funding
The Project: Albacete-Alicante HSL

Albacete-Alicante is a section of Madrid – Levante line

Main high-speed line project components

- Infrastructure
  - Stations
  - Superstructure
  - Substructure
  - Signalling and Telecommunications, main focus of PPP contract
- Passenger operators
- Freight operators
- Capacity allocation and traffic management

Main elements of S&T facilities

- ERTMS
  - Signalling system (ETCS)
  - Rail telecommunication system (GSM-R)
- Complementary safety (detection) systems
- Integration into the Operational Command centre
- Interface between infrastructure S&T systems and the on board rolling stock subsystems (ETCS and GSM-R radio equipment)

High-speed network development

- Adaptation to high speed of the 65 km route and existing facilities between Albacete and Almansa
- Construction of a new high-speed track-bed for 100 km between Almansa and Alicante
- Installation of S&T facilities in the 165 km of HSL (High Speed Line) double track between Albacete and Alicante, including railway stations and passing tracks

Works performed in Albacete-Alicante

Madrid - Castile-La Mancha - Valencia region - Murcia region high-speed line (HSL)

Albacete-Alicante 165 km section
## PPP Structure

### ADIF’s first PPP project

**Public Sector Consideration**
- The duration of the Design, Build, Finance, and Maintain (DBFM) contract is 2+20 years
- **Two stage tender** process: competitive dialogue + final offer
- Chose one contract to **avoid interface risks**
- Technology-based PPP kept **focus on maintenance rather than civil construction risk**

**EIB early involvement**
- EIB provided technical support in structuring the PPP since inception
- Availability of EIB financing was incorporated into tender documents, creating better transfer of financial value
- During the tender process supported all the bidding consortia with a common term sheet.
- Developed the Financial documentation with the awarded SPV

### Project timeline

- **Design** 4 months
- **Execution of works** 16 months
- **System validation and verification of the layout** 4 months
- **Construction period** 2 years
- **Maintenance period** 20 years
**Tender Process**

**Short and well managed process**

- The objective of the PPP contract was to **integrate detailed design, construction and maintenance phases** in order to minimize integration risk between the phases.
- The final PPP contract covered design, construction, financing and maintenance of S&T facilities (DBFM).
- PPP procurement and resulting project finance structure facilitated access to bank financing and reduced the reliance on solely state and corporate resources.
- The private partner could make independent decisions on the allocation of the project budget between construction and maintenance phases. Considering the high maintenance costs of the S&T components, **using a life-cycle approach** helps to reduce overall costs.

---

**PPP project preparation**

- 5 groups prequalified based on 30% financial and 70% technical criteria.
- The first delivery of economic and technical proposals was followed by a negotiated procedure. All consortia had access to EIB financing for financial proposals.
- The contract was awarded to a consortia led by ALSTOM Transport based on submitted BAFO, assigning **equal weight to financial and technical characteristics**.
- Adif technical expertise key to successful evaluation of bids during PPP procurement.
- Awarded in December 2011 to an SPV consisting of four industrial partners.
## Project Risk Sharing

### Fair Risk Allocation allowing long term financing

<table>
<thead>
<tr>
<th>Risk allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Balanced and fair risk allocation between public and private: risks allocated to the best prepared party to bear it, otherwise the project becomes ineffective, expensive or even unfeasible.</td>
</tr>
<tr>
<td>▪ <strong>Risks assumed by ADIF</strong>: Expropriation risk, Force Majeure and rail incidents</td>
</tr>
<tr>
<td>▪ <strong>Risks assumed by the SPV</strong>: design, construction, maintenance &amp; availability.</td>
</tr>
<tr>
<td>▪ <strong>Shared risk</strong> (assumed by SPV up to certain limit and thereafter by ADIF) &amp; benefits (50% share of potential refinancing gains).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk sharing matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Risk Sharing Matrix" /></td>
</tr>
</tbody>
</table>

Public | Private
---|---
Land acquisition | ▼ |
Force majeure | ▼ |
Operator incidents | ▼ |
Voluntary termination | ▼ |
Inflation | ▼ |
Geological | ▼ |
Changes in regulations | ▼ |
Project amendments | ▼ |
Financial closing | ▼ |
Refinancing&insurance | ▼ |
Design&Construction | ▼ |
Maintenance costs | ▼ |
Availability | ▼ |
Level of service | ▼ |
Interest rates | ▼ |
Technology | ▼ |
Payment mechanism

Two differentiated revenues during operation

<table>
<thead>
<tr>
<th>Payment from ADIF</th>
<th>Contract value in € mln</th>
</tr>
</thead>
<tbody>
<tr>
<td>• During construction: 40% of investment financed by ADIF (including EUR4.4m of TEN-T grant)</td>
<td>Tendered</td>
</tr>
<tr>
<td>• During operation:</td>
<td></td>
</tr>
<tr>
<td>▪ 15 yrs deferred investment payments, not subject to deductions</td>
<td></td>
</tr>
<tr>
<td>▪ 20 yrs Availability Payments</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Tendered</th>
<th>Awarded</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAPEX</td>
<td>213.4</td>
<td>132.6</td>
<td>-38%</td>
</tr>
<tr>
<td>Construction phase (40%)</td>
<td>85.4</td>
<td>53.0</td>
<td>-38%</td>
</tr>
<tr>
<td>Deferred payments (60%)</td>
<td>128.0</td>
<td>79.6</td>
<td>-38%</td>
</tr>
<tr>
<td>OPEX</td>
<td>165.3</td>
<td>105.4</td>
<td>-36%</td>
</tr>
<tr>
<td>Financial costs</td>
<td>48.5</td>
<td>33.2</td>
<td>-32%</td>
</tr>
<tr>
<td><strong>Total contract value</strong></td>
<td><strong>427.2</strong></td>
<td><strong>271.1</strong></td>
<td><strong>-37%</strong></td>
</tr>
</tbody>
</table>

Revenue breakdown of the SPV

15 years:
60% of CAPEX used to service EIB’s loan

2 years
40% of CAPEX

20 years:
O&M costs, replacement, taxes, equity payback and IRR
# Financial Plan

## Project Finance capital scheme

<table>
<thead>
<tr>
<th>Senior loan</th>
<th>Subordinated loan</th>
<th>Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>- The early involvement of EIB allowed the cost advantage of EIB lending to be transferred to the public sector; EIB long term debt proved to be crucial for the financial close</td>
<td>- Fond ICO provided a subordinated debt facility complementing the project financing and acting as contingency buffer</td>
<td>- Equity predefined as 10% of total construction cost</td>
</tr>
<tr>
<td>- EIB provided a fixed interest rate</td>
<td>- Structurally subordinated to EIB loan</td>
<td>- ADIF took 10% equity stake</td>
</tr>
<tr>
<td>- EIB loan repaid with the 15 yrs deferred CAPEX payments (not exposed to performance risk) which drove to competitive pricing and efficient amortization profile: sculpted with 1.05x</td>
<td>- Repayment of the loan from excess on deferred CAPEX payment and Availability Payment</td>
<td>- Initial industrial partners participating in the equity of the SPV were joined prior to the financial close by two public investment funds – Fond ICO and CDC Infra</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Lesson Learned

A summary of key points in best practice in PPP procurement of ERTMS

Initiation
- Detailed Identification of objectives
- ADIF proactive
- EIB involved early
- Experienced advisers both in PPPs and in ERTMS

Preparation, Carve out
- Limited scope: limits technology/project risks
- Suitable risk allocation public/private
- Focus on Opex

Implementation & operation
- Team approach: all parties in SPV including Grantor
- Expertise in Execution
- Objectives met, tender planning respect

Procurement
- Prequalification based both on financial and technical capabilities
- Expertise available for evaluation of both aspects
- Negotiations before BAFO
Modalities for the differentiation of TAC for ERTMS

I. Vandoorne

Bruxelles 20/01/15
What?

- Infrastructure charges for the use of ERTMS corridors shall be differentiated to give incentives to equip trains with the ETCS
- Legal base =
  - Article 32(4) of Directive 2012/34/EU (on the single European railway area)
  - Recital 48 "in order to accelerate the installation of the ETCS on board locomotives, IM should modify the charging system through a temporary differentiation for trains equipped with ETCS. Such a differentiation should give appropriate incentives to equip trains with ETCS."
Mandate to the Commission

- First do an impact assessment
- Then adopt measures
- Before 16 June 2015
- Act adopted in accordance with the examination procedure (implementing act)
- Act setting out the modalities to be followed in applying the differentiation
Conditions

- Differentiation in accordance with a timeframe consistent with the Deployment Plan (2012/88/EC)
- Ensure that the differentiation does not result in any overall change in revenue for the IM
- The measure shall adapt the modalities applicable to trains operating local and regional services using a limited section of the corridors
- The measure shall not result in undue distorsion of competition between RU should not affect the overall competitiveness of the rail sector
- Differentiation shall be adapted to trains local/regional trains using limited sections of the ERTMScorridors
Member States may...

- According to Art 2(11), MS may exclude trains used for regional services placed in service before 1985.
- According to Art 32(4), MS may decide
  - that the differentiation does not apply to ERTMS corridors on which only ETCS trains may run;
  - to extend this differentiation to lines not specified in Com Dec 2012/88/EU.
Why?

- There are major delays in the on-board and on-track deployment of the European Train Control System (ERTMS/ETCS) along the lines of ERTMS corridors.
- This leads to delays in the enhancement of technical performance of the corridors, hinders the competitive position of rail vis-à-vis road sector.
- Measures adopted so far on the EU or national level tackle the deployment of ETCS infrastructure or deployment of on-board ETCS on new vehicles. They leave unattended the need to retrofit existing vehicles.
- The size of the fleet yet to be retrofitted ranges between 7,500 and 10,500 locomotives. The likely costs, estimated between €6.3 and €8.8 billion, are too high for the sector.
- Moreover, railway undertakings (RU) tend to postpone the retrofitting until the trackside deployment is well advanced.
Problem definition

Problem
Delays in the deployment of the on-board ETCS equipment in particular in relation to the retrofitting of old rolling stock

Problem Drivers
- Reduced national budgets to the railways
- Lengthy administrative process to obtain funding
- Only partial funding for ERTMS
- Economic crisis has led to fewer funds available for investment
- Less access to bank finance
- Root causes

- Financial constraints on RUs limiting their ability to retrofit locomotives
- The renewal profile of existing rolling stock
- The cost of retrofitting locomotives is very high
- The uncertain and diversified national legislative environment where there is no EU wide approach to when ERTMS should be fitted on national networks
- Differing standards
- Different corridors
- Insufficient capacity in the supply industry
- National requirements for ETCS
- Different costs depending on fleet size
- Delays in investment and deployment
- EU deployment is not on target

Root causes

General Objective
To ensure the rapid deployment of on-board ETCS to contribute to the completion of the Single European Railway Area and maintain the competitiveness of rail transport

Specific Objective
To increase the number of retrofitted locomotives with on-board ETCS

Operational Objective
To develop a non-discriminatory framework to incentivise ETCS retrofitting

Policy Option A
Status quo “Baseline” Scenario

Policy Option B
“Special levy” approach

Policy Option C
“Discount” approach

Policy Option D
“Discount and Levy” approach

Policy Option E
Horizontal measures

Economic crisis has led to fewer funds available for investment

Delays in the deployment of the on-board ETCS equipment in particular in relation to the retrofitting of old rolling stock
Baseline+ 3 main policy options

- Baseline
- **Special levy** for trains that are **not equipped** provided the levy is reinvested in a **fund** to equip trains – the levy only applies to equipped infrastructure.

- **Discount for trains that are equipped**, provided the discount is compensated by public funds (e.g. grant to the infrastructure manager) – the discount is capped at max level 50% of the value of ETCS retrofit, but requires government funding to maintain the overall revenue of the infrastructure.

- **Special levy and discount** provided the levy for trains that are unequipped finances the discounts of trains that are equipped). The moneys gathered by the special levy and reused to pay for the discounts – levies are confined to equipped infrastructure.
State of play - forecast

- Support study accepted in October 2014
- Draft Commission Impact assessment to be accepted by Commission internal IA board
- Draft measure discussed with Member States in March 2015 in Committee (SERAC)
- Draft measure submitted to SERAC for opinion mid-May 2015
- Measure adopted before 16/06/2015
Technical support for the Deployment of ERTMS along the core network corridors

Provided by Ineco and E&Y
Seven tasks, three main workstreams and two other transversal activities

- **T1. Deployment program management - Overall management**
  - T4. Building a consolidated deployment programme and maintain it.
  - T5. To facilitate and monitor the implementation of the Deployment Programme and to report on it.
  - T6. Detailed technical follow up of ERTMS projects and technical assistance.

- **T2. Cooperation and coordination**

- **T3. Information and communication**
The team

Supported by experts
Thank you for your attention