

The image features the coat of arms of the Republic of Bulgaria, which is a heraldic emblem. It consists of a central shield with a red field and a golden lion rampant. The shield is surmounted by a golden crown with a cross on top. On either side of the shield are two golden lions rampant, each holding a golden scepter. The entire emblem is encircled by a wreath of green oak leaves and golden acorns. At the bottom, a red ribbon with white text contains the motto: "СЪЕДИНЕНИЕТО ПРАВИ СИЛАТА".

**NATIONAL ERTMS DEPLOYMENT PLAN
OF THE REPUBLIC OF BULGARIA**

Introduction

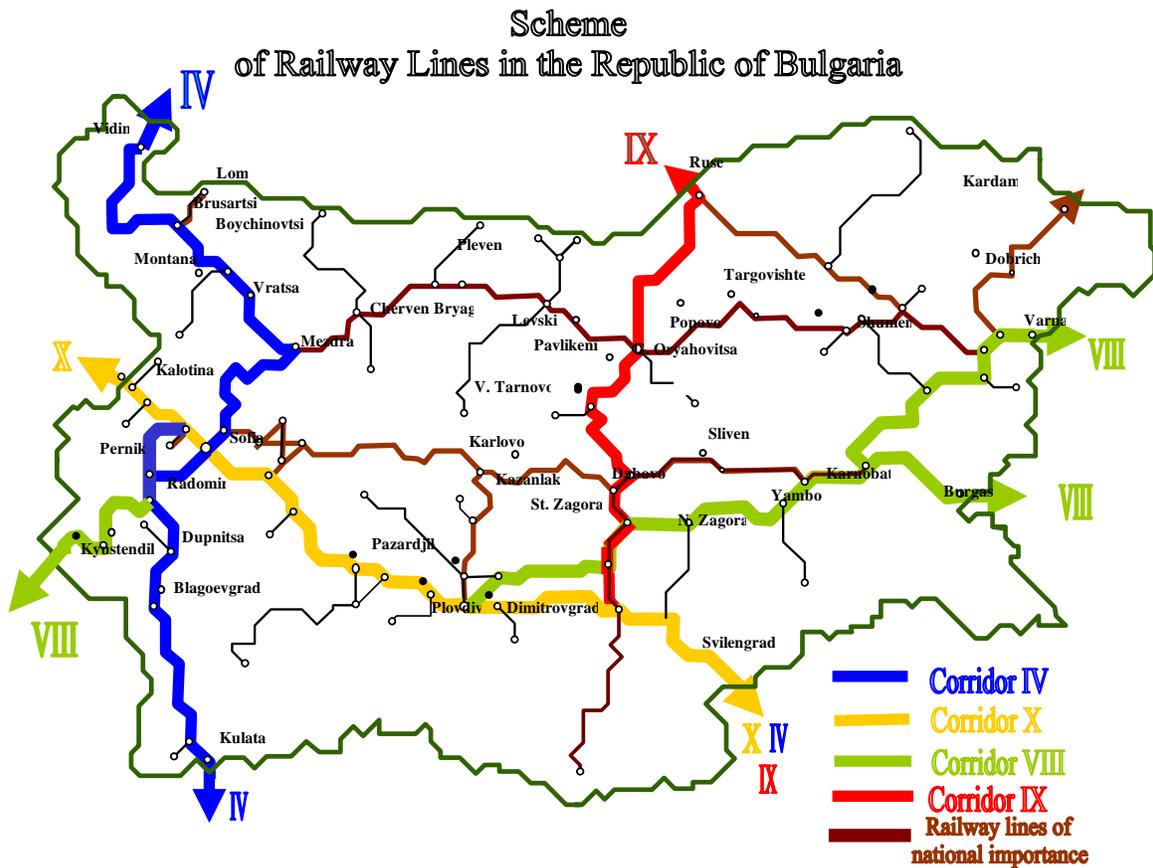
The National ERTMS Deployment Plan is oriented towards creation of a modern and competitive railway network whereas full capacity of information and communication technologies is used with the purpose of effective traffic management to be reached.

Quickness, simultaneousness and completeness upon realization which may be treated as a strategic priority, and may also lead to a maximum return under consideration of a longer period of time.

The intents of the Republic of Bulgaria for implementation ERTMS/ETCS are represented within the frame of the Plan.

The choice has been made on the grounds of a preliminary cost-benefit analysis (CBA) and the railway infrastructure projects proposed for the period 2007 – 2013 under the Sectoral Operational Programme on Transport (SOPT).

The basic parameters are: time horizon; improvement of capacity after implementation of the selected type of ERTMS/ETCS; percentage of average increase of traffic on annual basis; results of costs-benefit analysis and investments needed.



| Trans-European Corridor X Kalotina – Sofia - Svilengrad | | |
|---|----------|-------------|
| Falls into three sections: Kalotina-Sofia; Sofia-Plovdiv; Plovdiv-Svilengrad | | |
| Length 358 km (single railway tracks -188 km; doubled railway tracks -170 km; electrified - 211 km; under electrification -147 km) | | |
| Objectives: | | |
| Achievement of interoperability; improvement of capacity - 5.65% trains/per year; reduction of traveling time -20%; reduction of average delays - 25%; increase of commercial speed - 20% | | |
| Programme: | | |
| Kalotina – Sofia Traffic – average growth of 1.69% per year | Level 1* | 2010 – 2013 |
| Sofia-Plovdiv Traffic – average growth of 3.98% per year | Level 1* | 2010 – 2015 |
| Plovdiv - Dimitrovgrad – Svilengrad Traffic – average growth of 2% per year | Level 1* | 2007 – 2010 |
| Results of Cost-Benefit Analysis (CBA) | | |
| A preliminary financial and economic analysis has been carried out: Estimated time horizon for the period 2008-2032. Discount rate (required rate of return) – 6%. FIRR>6% EIRR>6%; FNPV>0; ENPV>0 for ERTMS/ETCS level 2. FIRR<6% EIRR>6%; FNPV<0; ENPV>0 for ERTMS/ETCS level 1. For all sections the criteria as a result of the financial and economic analysis are proved to be better for ERTMS/ETCS Level 2. | | |
| Investments needed for ERTMS/ETCS Level 2: 82,058,339.00 Euro; 229,213.24 Euro per km. For activities under the preparatory stage - 16,411,668.00 Euro. | | |

* It is proposed for financing under the Sectoral Operational Programme on Transport (SOPT) for **level 1**.

**Trans-European Corridor IX
Ruse - Gorna Oryahovitsa - Dimitrovgrad**

*(Dimitrovgrad –Svilengrad is also a part of Corridor X and is included in the section Plovdiv -
Svilengrad)*

Falls into two sections: Ruse – Gorna Oryahovitsa and Gorna Oryahovitsa - Dimitrovgrad

Length 310 km (single railway tracks 310 km; electrified 310 km)

Objectives:

Achievement of interoperability;

Improvement of capacity - 5.43% trains/per year; reduction of traveling time -20%; reduction of average delays -25%; increase of commercial speed - 20%

Programme:

Ruse – Gorna Oryahovitsa

Traffic – average growth of 3.96% per year

Level 2

2013 – 2017

Gorna Oryahovitsa - Dimitrovgrad

Traffic – average growth of 2.74% per year

Level 2

2013 – 2017

Results of Cost Benefit Analysis (CBA)

A preliminary financial and economic analysis has been carried out:

Estimated time horizon for the period 2008-2032.

Discount rate (required rate of return) – 6%.

FIRR>6% EIRR>6%; FNPV>0; ENPV>0 for ERTMS/ETCS level 2.

FIRR<6% EIRR>6%; FNPV<0; ENPV>0for ERTMS/ETCS level 1.

For all sections the criteria as a result of the financial and economic analysis are proved to be better for ERTMS/ETCS Level 2.

Investments needed for **ERTMS/ETCS level 2: 56,949,948.00 Euro;**

183,709.51 Euro per km.

For activities under the preparatory stage - **11,389,990.00 Euro.**

**Trans-European Corridor IV
Vidin – Sofia -Kulata**

Falls into three sections: Vidin – Mezdra; Mezdra – Sofia; Sofia - Kulata;

Length 537 km (single railway tracks – 427 km; doubled railway tracks - 110 km; electrified - 537 km.)

Objectives:

Achievement of interoperability;

Improvement of capacity - 6.77% trains/per year; reduction of traveling time -20%; reduction of average delays - 25%; increase of commercial speed -20%

Programme:

| | | |
|--|----------|-------------|
| Vidin - Mezdra Traffic – average growth of 4.73% per year | Level 1* | 2011 – 2017 |
| Mezdra - Sofia Traffic – average growth of 5.28% per year | Level 1* | 2011 – 2017 |
| Sofia – Kulata (Voluyak – Pernik, inclusive) Traffic – average growth of 1.82% per year | Level 2 | 2013 – 2020 |

Results of Cost Benefit Analysis (CBA)

A preliminary financial and economic analysis has been carried out:

Estimated time horizon for the period 2008-2032.

Discount rate (required rate of return) – 6%.

FIRR>6% EIRR>6%; FNPV>0; ENPV>0 for ERTMS/ETCS level 2.

FIRR<6% EIRR>6%; FNPV<0; ENPV>0 for ERTMS/ETCS level 1.

For all sections the criteria as a result of the financial and economic analysis are proved to be better for ERTMS/ETCS Level 2.

Investments needed for **ERTMS/ETCS level 2: 109,179,106.00 Euro;**
203,313.05 Euro per km.

For activities under the preparatory stage - **21,835,821.20 Euro.**

*It is proposed for financing under the Sectoral Operational Programme on Transport (SOPT) for **level 1.**

| Trans-European Corridor VIII Gueshevo - Sofia - Plovdiv – Stara Zagora – Burgas/ Varna <i>(Sofia – Plovdiv is included in Corridor X)</i> | | |
|---|-----------|-------------|
| Falls into three sections: Plovdiv – Stara Zagora - Burgas; Karnobat – Varna; Gueshevo – Radomir - Sofia | | |
| Length 537 km (single railway tracks 296 km; doubled railway tracks - 241 km; electrified – 314 km; non electrified - 223 km; Plovdiv – Stara Zagora – Burgas - ETCS Level 1) | | |
| Objectives: Achievement of interoperability; Improvement of capacity - 6.16% trains/per year; reduction of traveling time - 20%; reduction of average delays - 25%; increase of commercial speed - 20% | | |
| Programme: | | |
| Plovdiv – Stara Zagora - Burgas Traffic – average growth of 1.94 % per year | Level 2 | 2008 – 2015 |
| Karnobat – Varna Traffic – average growth of 4.38 % per year | Level 2 | 2009 – 2016 |
| Gueshevo - Radomir (Sofia)* Traffic – average growth of 3.90 % per year | Level 2** | 2017 – 2020 |
| Results of Cost Benefit Analysis (CBA) | | |
| A preliminary financial and economic analysis has been carried out: Estimated time horizon for the period 2008-2032. Discount rate (required rate of return) – 6%. FIRR>6% EIRR>6%; FNPV>0; ENPV>0 for ERTMS/ETCS level 2. FIRR<6% EIRR>6%; FNPV<0; ENPV>0 for ERTMS/ETCS level 1. For all sections the criteria as a result of the financial and economic analysis are proved to be better for ERTMS/ETCS Level 2. | | |
| Investments needed for ERTMS/ETCS level 2: 105,532,428.00 Euro; 196,522.21 Euro per km. For activities under the preparatory stage - 21,106,486.00 Euro. | | |

* The section of Radomir – Sofia is a part of Corridor IV and is included in the section of Sofia – Kulata.

* * In the presence of connection with Macedonian railways' network.

| Railway lines of national importance | | |
|---|---------|-------------|
| Sofia (Iliyantsi) - Karlovo - Zimnitsa; Mezdra - Gorna Oryahovitsa; Gorna Oryahovitsa – Sindel (Varna); Ruse – Kaspichan; Brusartsi – Lom | | |
| Length 901 km (single railway tracks – 472 km; doubled railway tracks - 429 km; electrified - 901 km.) | | |
| Objectives: | | |
| Achievement of interoperability; Improvement of capacity - 5.77% trains/per year; reduction of traveling time - 20%; reduction of average delays - 20%; increase of commercial speed - 25% | | |
| Programme: | | |
| Sofia (Iliyantsi) - Karlovo - Zimnitsa Traffic – average growth of 2.41% per year | Level 2 | 2009 – 2015 |
| Mezdra - Gorna Oryahovitsa Traffic – average growth of 5.70% per year | Level 2 | after 2020 |
| Gorna Oryahovitsa – Sindel Traffic – average growth of 5.16% per year | Level 2 | after 2020 |
| Ruse – Kaspichan Traffic – average growth of 5.36% per year | Level 2 | 2010 – 2015 |
| Brusartsi – Lom Traffic – average growth of 5.87% per year | Level 2 | 2011 – 2017 |
| Results of Cost Benefit Analysis (CBA) | | |
| A preliminary financial and economic analysis has been carried out: Estimated time horizon for the period 2008-2032. Discount rate (required rate of return) – 6%. FIRR>6% EIRR>6%; FNPV>0; ENPV>0 for ERTMS/ETCS level 2. FIRR<6% EIRR>6%; FNPV<0; ENPV>0 for ERTMS/ETCS level 1. For all sections the criteria as a result of the financial and economic analysis are proved to be better for ERTMS/ETCS Level 2. | | |
| Investments needed for ERTMS/ETCS level 2: 167,607,599.00 Euro; 186,023.97 Euro per km. For activities under the preparatory stage - 33, 521,519.80 Euro. | | |

| Railway lines of regional importance | | |
|---|----------|-------------|
| Philipovo - Karlovo; Razdelna – Kardam; Dimitrovgrad - Podkova | | |
| Length 291 km (single railway tracks - 291 km; electrified - 61 km) | | |
| Objectives: | | |
| Achievement of interoperability; Improvement of capacity - 9.23% trains/per year; reduction of traveling time - 15%; reduction of average delays - 20%; increase of commercial speed - 15% | | |
| Programme: | | |
| Philipovo – Karlovo Traffic – average growth of 5.39% per year | Level 2* | 2015 - 2020 |
| Razdelna – Kardam Traffic – average growth of 4.72% per year | Level 2* | after 2020 |
| Dimitrovgrad – Podkova Traffic – average growth of 6.00% per year | Level 2* | after 2020 |
| Results of Cost Benefit Analysis (CBA) | | |
| A preliminary financial and economic analysis has been carried out: Estimated time horizon for the period 2008-2032. Discount rate (required rate of return) – 6%. FIRR<6% EIRR>6%; FNPV<0; ENPV>0 for ERTMS/ETCS level 2. FIRR<6% EIRR<6%; FNPV<0; ENPV<0 for ERTMS/ETCS level 1. For all sections the criteria as a result of the financial and economic analysis are proved to be better for ERTMS/ETCS Level 2. | | |
| Investments needed for ERTMS/ETCS level 2: 48,056,855.00 Euro; 165,143.83 Euro per km. For activities under the preparatory stage - 9,611,371.00 Euro. | | |

* With a possibility for ERTMS Regional.

Glossary:

FIRR – Financial Internal Rate of Return;
EIRR – Economic Internal Rate of Return;
FNPV – Financial Net Present Value;
ENPV – Economic Net Present Value;
CBA – Cost-Benefit Analysis.

Total investments needed for ERTMS/ETCS level 2 - 683,261,131.00 Euro,
out of which:

- for building up of ERTMS/ETCS on the railway network - **569,384,275.00** Euro,
- for activities under preparatory stage - **113,876,856.00** евро.

Investments needed for on-board equipment of locomotives for ERTMS/ETCS level 2 - **70.99 million Euros for the period 2008-2032.**