# ERTMS gaps prioritisation on the Core Network Corridors per Member State

ERTMS Deployment management team
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# 1. PURPOSE AND SCOPE

The purpose of this document is shortlisting the Core Network Corridors (CNC) rail lines on which the ETCS deployment should be considered as a priority from the EU perspective. The list is elaborated on the basis of a number of relevant criteria.

This document reports on the ETCS deployment status in the CNC per Member State, describes the criteria and methodology followed to prioritise gaps in the CNC and identifies the CNC gaps (i.e. sections that are not expected to fall under any of the following categories: ”ETCS under construction” or “ETCS in operation” at present or in the short term).

The scope of this document is limited to CNC lines that belong to EU Member States. In addition, the criteria to prioritise the gaps are focused on traffic flow data and ERTMS-related aspects. Other TEN-T parameters such as electrification, line speed, track gauge, etc. were not considered but they can be relevant for the final selection of prioritised lines.

Lines that are already in operation, under construction or included in a CEF-funded project are identified per Member State (see Annex A). The delta between the whole CNC rail lines and the line categories identified above is considered as a gap for the purposes of this analysis.

Based on those identified gaps, the ETCS deployment in the countries belonging to the CNC (i.e. the Member States plus Norway, Switzerland and the United Kingdom) was classified in Section 3 according to the following categories: “No ETCS”, “ETCS islands”, “ETCS network with gaps” and “ETCS network without gaps”. This classification is relevant for the prioritisation of gaps in each Member State.

Section 4 describes the criteria and methodology used to prioritise the gaps per Member State. The results are summarised in a matrix in Annex B, which contains a detailed evaluation per Member State.

Section 5 identifies the lines that should be prioritised by Member State according to the criteria and methodology described in Section 4. This information is presented along with CNC sketches both per Member State (see Section 5) and per corridor (see Annex C). In addition, subsection 5.26 includes a comparison of the length of the priority gaps found per Member State.

The conclusions, in section 6, contain a summary of the results obtained from the analysis.

# 2. REFERENCES

[1] European Commission, "European Commission. Cohesion Fund," [Online]. Available: https://ec.europa.eu/regional_policy/en/funding/cohesion-fund/.

[2] CNC contractors' team, "Dataset of the Rail Traffic data in shapefile format. TENtec_railway_net_20191112," 2019.

[3] BBT (Brenner Base Tunnel), , «Brenner Base Tunnel,» [En línea]. Available: https://www.bbt-se.com/en/.

[4] European Commission (EC), «COMMISSION IMPLEMENTING REGULATION (EU) 2017/6 of 5 January 2017 on the European Rail Traffic Management System European deployment plan,» 2017.

# 3. ETCS DEPLOYMENT IN CNC COUNTRIES

Railway lines that are already in operation, under construction or funded by a CEF project and expected to be under construction in the short term are identified per country in Annex A: ETCS status in the CNC.

As regards CEF funded projects, a section is expected to be under construction in the short term only when specific information from the stakeholder on the ongoing deployment activities is available.

The delta between the identified lines and CNC is considered as a gap for the purposes of this analysis. Based on those identified gaps, this section classifies the ETCS deployment status in the countries that belong to the CNC (i.e. Member States plus Norway, Switzerland and the United Kingdom). A country could belong to several categories depending on the status of the different corridors crossing that country.

The following ETCS deployment categories were defined:

- No ETCS: This category includes countries where no CNC sections are expected to be fitted with ETCS in the short term in a specific corridor.

- ETCS islands: This category includes countries where the ETCS deployment in the CNC will be undertaken only in isolated sections, without providing continuity along the corridor.

- ETCS network with gaps: This category includes countries where ETCS deployment in the CNC is undertaken although some sections are not expected to be ETCS under construction or in operation in the short term.

- ETCS network without gaps: This category includes countries that do not have ETCS gaps in the CNC, e.g. Luxembourg.

The following table indicates the ETCS deployment categories of each CNC country and per corridor when relevant. It also identifies whether the county is an EU Member State and Cohesion Fund recipients in the 2014-2020 period [1]. Note: this report focuses only on EU Member States. Countries highlighted in grey in the table are countries that are not EU Member States but are located on the Core Network Corridor.

| Country | Current ETCS deployment by considering only the CNC | Cohesion Fund recipients | EU Member State |
|---|---|---|---|
| Austria | ETCS Islands (BAC) / ETCS network with gaps (RDN) / no gaps (OEM & SCM) | No | Yes |
| Belgium | ETCS network with gaps | No | Yes |
| Bulgaria | ETCS Islands | Yes | Yes |
| Croatia | ETCS Islands | Yes | Yes |
| Czechia | ETCS Islands (OEM & RDN) / ETCS network with gaps (BAC) | Yes | Yes |
| Denmark | ETCS Islands | No | Yes |
| Estonia | No ETCS | Yes | Yes |
| Finland | No ETCS | No | Yes |
| France | ETCS Islands | No | Yes |
| Germany | ETCS Islands (NSB, OEM, RDN, SCM)/ ETCS network with gaps (ATL, RALP) | No | Yes |
| Greece | ETCS network with gaps | Yes | Yes |
| Hungary | ETCS network with gaps | Yes | Yes |
| Ireland | No ETCS | No | Yes |
| Italy | ETCS Islands (BAC, MED & SCM)/ ETCS network with gaps (RALP) | No | Yes |
| Latvia | No ETCS | Yes | Yes |
| Lithuania | No ETCS | Yes | Yes |
| Luxembourg | ETCS network without gaps | No | Yes |
| Netherlands | ETCS Islands (NSB) / ETCS network with gaps (RALP & NSM) | No | Yes |
| Norway | ETCS network with gaps | No | No |
| Poland | ETCS Islands (BAC) / ETCS network with gaps (NSB) | Yes | Yes |
| Portugal | ETCS Islands | Yes | Yes |
| Romania | ETCS Islands | Yes | Yes |
| Slovakia | ETCS Islands | Yes | Yes |
| Slovenia | ETCS network with gaps | Yes | Yes |
| Spain | ETCS Islands | No | Yes |
| Sweden | No ETCS | No | Yes |
| Switzerland | ETCS network without gaps | No | No |
| United Kingdom | ETCS Islands | No | No |

# 4. CRITERIA AND METHODOLOGY FOR PRIORITISING GAPS IN THE CNC

This section describes the criteria used to prioritise gaps (i.e. sections that are not expected to be fitted with ETCS in the short term) in the CNC. The evaluation criteria were agreed with the Commission.

The following list presents the criteria to be considered in order of importance, i.e. first the most relevant criteria for prioritising gaps:

- Location of the ETCS gap in terms of the ETCS deployment: prioritisation of gaps located next to sections already equipped with ETCS in operation or under construction.
- Traffic flows: prioritisation of lines with higher density of traffic. The traffic flow considers both freight and passenger flows when available in the Dataset of the Rail Traffic data elaborated by the CNC contractors' team [2].
- Freight/passenger lines: prioritisation of freight lines vs passenger lines.
- Length of the gap: prioritisation of shorter gaps vs longer gaps.
- Location of the gaps in the CNC: prioritisation of sections located next to cross-border sections up to the first main node vs gaps located in the Member State.
- Infill device: in case of ETCS Level 1, prioritisation of lines expected to be equipped without Radio Infill Unit (RIU) or Euroloop.
- Status of the line: prioritisation of existing lines vs lines to be constructed.
- Alternative routes: prioritisation of lines that connect two nodes that are not connected by other CNC lines.
- ETCS level: prioritisation of lines to be equipped with ETCS Level 2 vs ETCS Level 1.
- GSM-R status: prioritisation of lines with GSM-R in operation or under construction vs lines not equipped with GSM-R.
- ETCS Baseline: prioritisation of lines using Baseline 3 vs Baseline 2.
- Member State (MS) planned date: prioritisation of those lines with earlier implementation dates.

Those criteria were chosen with the aim of closing the ETCS gaps in the CNC and allowing a continuous operation with ETCS on it. For this reason, the criteria focused on the location of the gap in the CNC and on the current ETCS deployment, the traffic flow and the ETCS characteristics of the gaps. However, other TEN-T parameters, such as, electrification, line speed, track gauge, etc. could be relevant to the final selection of prioritised lines.

Cost per project could not be estimated because this depends on a number of technical aspects that should be investigated further, such as whether interlockings need to be modified. Without doing interviews or gathering specific information on each project, any cost estimate would not be accurate enough. As a result, only the length in km of the section is provided.

## 4.1 *Methodology followed to select priority gaps*

This section describes the weights assigned to the criteria described in Section 4 and the methodology used to select priority gaps.

The weight assigned to the criteria described in Section 4 is indicated in the following table:

| Criteria | Weight |
|---|---|
| Location of the gap in terms of the ETCS deployment | 11 |
| Freight traffic | 10 |
| Length of the gap | 8 |
| Location of the gaps in the CNC | 7 |
| Infill device | 5 |
| Passenger traffic | 4 |
| Status of the line | 4 |
| No alternative routes | 4 |
| ETCS level | 2 |
| GSM- R status | 2 |
| ETCS baseline | 2 |
| Member State planned date | 1 |
| Total | 60 |

For the selection of priority gaps, a Gaps Weighted Criteria Matrix is calculated per Member State. These matrices include all the lines that are not expected to be fitted with ETCS, under construction or in operation in the short term in each Member State.

***Location of the gap in terms of the ETCS deployment***

All the gaps in the MS receive the "Location of the gap in terms of the ETCS deployment" points according to the location of the gap in terms of the ETCS deployment.

This means that if a section or node is connected to two other lines already equipped with ETCS (i.e. in operation) or with ETCS under construction, this line receives the total score.

However, if the section or node is connected only to one line which is already equipped with ETCS (i.e. in operation) or with ETCS under construction, it receives half the score.

***Traffic***

As explained in the Section 4, freight traffic is prioritised over passenger traffic and therefore has a greater weight in this Gaps Weighted Criteria Matrix.

- Freight Traffic

Freight traffic-related scoring is based on the following methodology:

Firstly, the highest amount of freight traffic running through the gaps of the analysed MS is identified (Max. Traffic). Max Traffic value is MS specific. The maximum scoring for freight traffic (i.e. 10 points) is assigned for "Max freight". Then, the scoring for all the gaps within that specific MS is distributed proportionally according to the amount of traffic that each gap has.

The following table shows as an example the traffic of the different gaps in Sweden. The maximum freight traffic is 16.801 trains/year, a value which is assigned a score of 10 points.

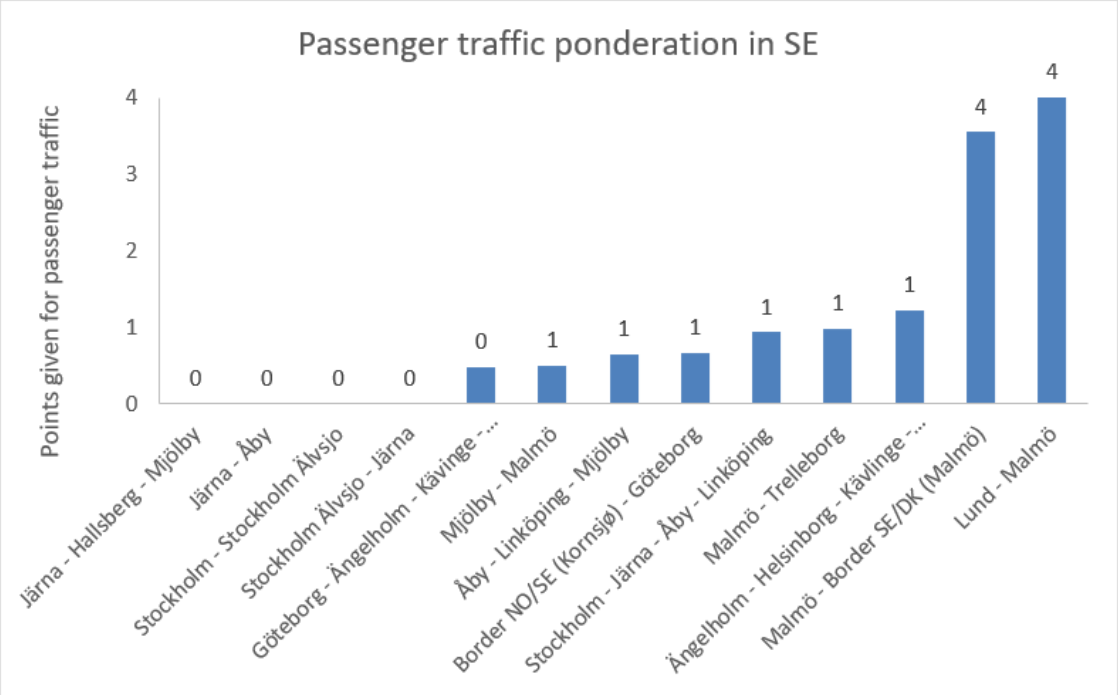
| Criteria | Freight (per Km) [trains/year] | Passengers (per Km) [trains/year] |
|---|---|---|
| Järna - Hallsberg - Mjölby | 7443 | 0 |
| Malmö - Trelleborg | 7494 | 33406 |
| Järna - Åby | 363 | 0 |
| Mjölby - Malmö | 13894 | 17222 |
| Malmö - Border SE/DK (Malmö) | 0 | 120587 |
| Ängelholm - Helsinborg - Kävlinge - Lund | 73 | 41400 |
| Göteborg - Ängelholm - Kävinge - Burlöv | 5733 | 16529 |
| Border NO/SE (Kornsjø) - Göteborg | 6030 | 22726 |
| Åby - Linköping - Mjölby | 8391 | 22035 |
| Stockholm - Järna - Åby - Linköping | 0 | 31851 |
| Stockholm - Stockholm Älvsjo | 1030 | 0 |
| Stockholm Älvsjo - Järna | 5631 | 0 |
| Lund - Malmö | 16801 | 136007 |

The following diagram shows the ranking of gaps in Sweden in relation to freight traffic volumes.


- Passenger Traffic

For passenger traffic the same methodology as for freight traffic is applied.

The following diagram shows, as an example, the score distribution for all gaps in Sweden regarding passenger traffic.




- Lines without traffic data

There are lines with no traffic data available, e.g. lines to be built. In these cases, the two methods are used:

- The first method is to award zero points to this line.
- The second method consists on awarding only half of the points related of the traffic criteria to existing lines that are not yet equipped with ETCS and for which there is no available information about their traffic flow [2]. In this method, the traffic related scoring will depend on the category of the line (passenger or freight). For example, if the line is categorised as a freight line without traffic information, it would receive half score for the freight traffic criterion (i.e. 5), but no points scores for passenger traffic, since this line was not planned for passenger traffic. However, If the line is categorised with mixed traffic, it would receive half of the freight traffic score (i.e. 5) and the half of the passenger traffic score (i.e. 2).

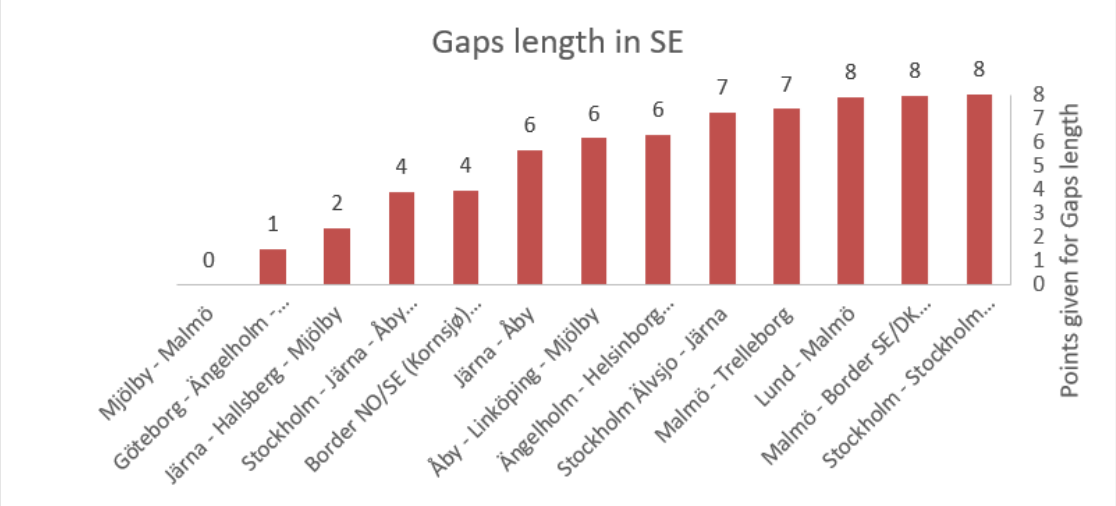
By default, the first method was used to select the priority gaps. However, the score obtained with the second method was included in Annex B for informative reasons.

Both scores are considered to identify the highest priority gaps in case of gaps without traffic information available in the Dataset of the Rail Traffic data developed by the CNC contractors' team [2].

***Length of the gap***

The rationale for scoring the length of the gap is the same as in the case of freight traffic. However, in this case the shortest gap is given the highest score (i.e. 8).

The following graph shows, as an example, the point distribution of all gaps in Sweden according to length of the gap criteria.




***Location of the gap in the CNC***

All the gaps which connect a cross-border section with a node receive the "Location of the gap in the CNC" points.

***Status of the line***

All the gaps whose infrastructure is already constructed (i.e. lines upgraded/modernised, but not yet equipped with ETCS) receive the "Status of the line" points.

***Infill device***

All the gaps which are planned without Radio Infill Unit (RIU) or Euroloop receive the "Infill device" points.

***No alternative routes***

All the gaps which do not currently have an alternative route with ETCS in operation in the CNC receive the "No alternative routes" points.

***ETCS level***

All the gaps which are planned to have ETCS Level 2, but where the readiness of the sections to such Level 2 deployment has not been assessed, receive the "ETCS level"

points. This means that the impact of a potential need to modernise the interlocking of the sections has not been evaluated.

***GSM-R status***

All the gaps which have already GSM-R in operation receive the "GSMR-R status" points. Those gaps which have GSM-R under construction receive the half of the "GSMR-R status" points.

***ETCS baseline***

All the gaps which are planned for development in compliance with ETCS Baseline 3 receive the "ETCS baseline" points.

***Member State planned date***

All the gaps which will be in operation by 2023 according to the Member State official plans receive the "Member State planned date" points.

As an example, the following table shows the Gaps Weighted Criteria Matrix for Sweden.

| Lines | % Method 1 | % Method 2 | Location of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM- R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lund - Malmö | 68 | 68 | 0 | 10 | 8 | 0 | 5 | 4 | 4 | 4 | 2 | 2 | 2 | 0 | 41 |
| Border NO/SE (Kornsjø) - Göteborg | 66 | 66 | 6 | 4 | 4 | 7 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 0 | 40 |
| Malmö - Border SE/DK (Malmö) | 64 | 64 | 0 | 0 | 8 | 7 | 5 | 4 | 4 | 4 | 2 | 2 | 2 | 1 | 39 |
| Malmö - Trelleborg | 53 | 53 | 0 | 4 | 7 | 0 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 0 | 32 |
| Åby - Linköping - Mjölby | 51 | 51 | 0 | 5 | 6 | 0 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 0 | 31 |
| Stockholm Älvsjo - Järna | 49 | 49 | 0 | 3 | 7 | 0 | 5 | 0 | 4 | 4 | 2 | 2 | 2 | 0 | 30 |
| Mjölby - Malmö | 46 | 46 | 0 | 8 | 0 | 0 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 0 | 28 |
| Stockholm - Stockholm Älvsjo | 46 | 46 | 0 | 1 | 8 | 0 | 5 | 0 | 4 | 4 | 2 | 2 | 2 | 0 | 28 |
| Ängelholm - Helsinborg - Kävlinge - Lund | 44 | 44 | 0 | 0 | 6 | 0 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 0 | 27 |
| Järna - Hallsberg - Mjölby | 43 | 43 | 0 | 4 | 2 | 0 | 5 | 0 | 4 | 4 | 2 | 2 | 2 | 0 | 26 |
| Järna - Åby | 41 | 41 | 0 | 0 | 6 | 0 | 5 | 0 | 4 | 4 | 2 | 2 | 2 | 0 | 25 |
| Göteborg - Ängelholm - Kävinge - Burlöv | 41 | 41 | 0 | 3 | 1 | 0 | 5 | 0 | 4 | 4 | 2 | 2 | 2 | 0 | 24 |
| Stockholm - Järna - Åby - Linköping | 33 | 33 | 0 | 0 | 4 | 0 | 5 | 1 | 0 | 4 | 2 | 2 | 2 | 0 | 20 |

The percentage represents the level of completeness of the line, with the understanding that a line is complete when it meets all the criteria explained above, so that the maximum is 68. In Sweden, the data traffic is available for all lines, and for this reason the % obtained following both methods is the same.

The Gaps Weighted Criteria Matrix is a working tool to select priority gaps. The Gaps Weighted Criteria Matrix per Member State are included in Annex B.

# 5. RESULTS OF THE ANALYSIS

This section identifies the lines that should be prioritised in each Member State according to the criteria and methodology described in Section 4.

## *5.1* ***Austria***

Austria has a mix of ETCS deployment categories. On the one hand, the ETCS deployment of the BAC corridor is focused on the sections which connect the capital city, Wien (Vienna), with the Czech border section (i.e. ETCS Islands). On the other hand, in the ETCS deployment of the RDN corridor, a limited number of lines are not expected to be under construction in the short term (i.e. ETCS network with gaps). In the case of the SCM and OEM corridors, they do not have any gap in the network because all the sections in these corridors are equipped with ETCS in operation or under construction.

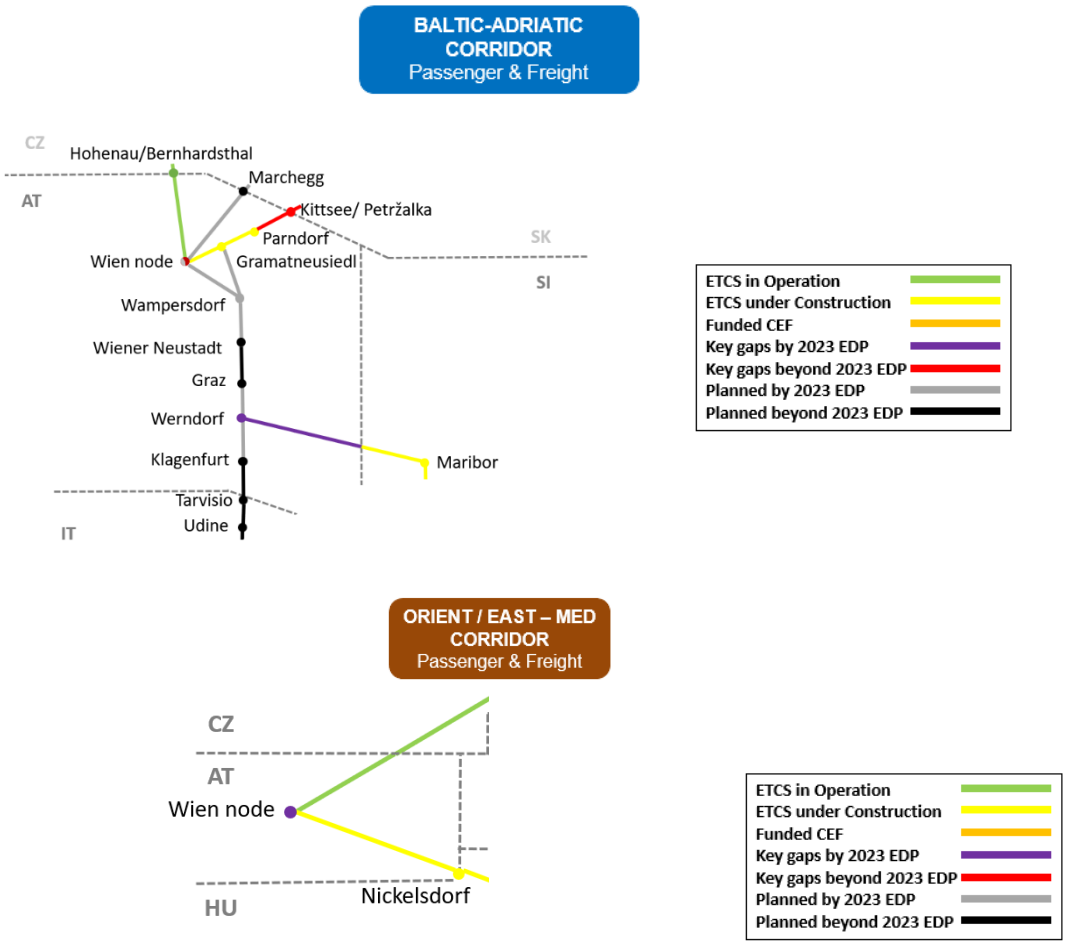
According to the EDP, this MS should equip with ETCS 1,182 km of lines belonging to the CNC by 2030. Of this length, 677 km are not expected to be under construction or in operation in the short term. The result is the prioritisation of 219 km. The reasons why those gaps were selected as a priority sections are explained below.

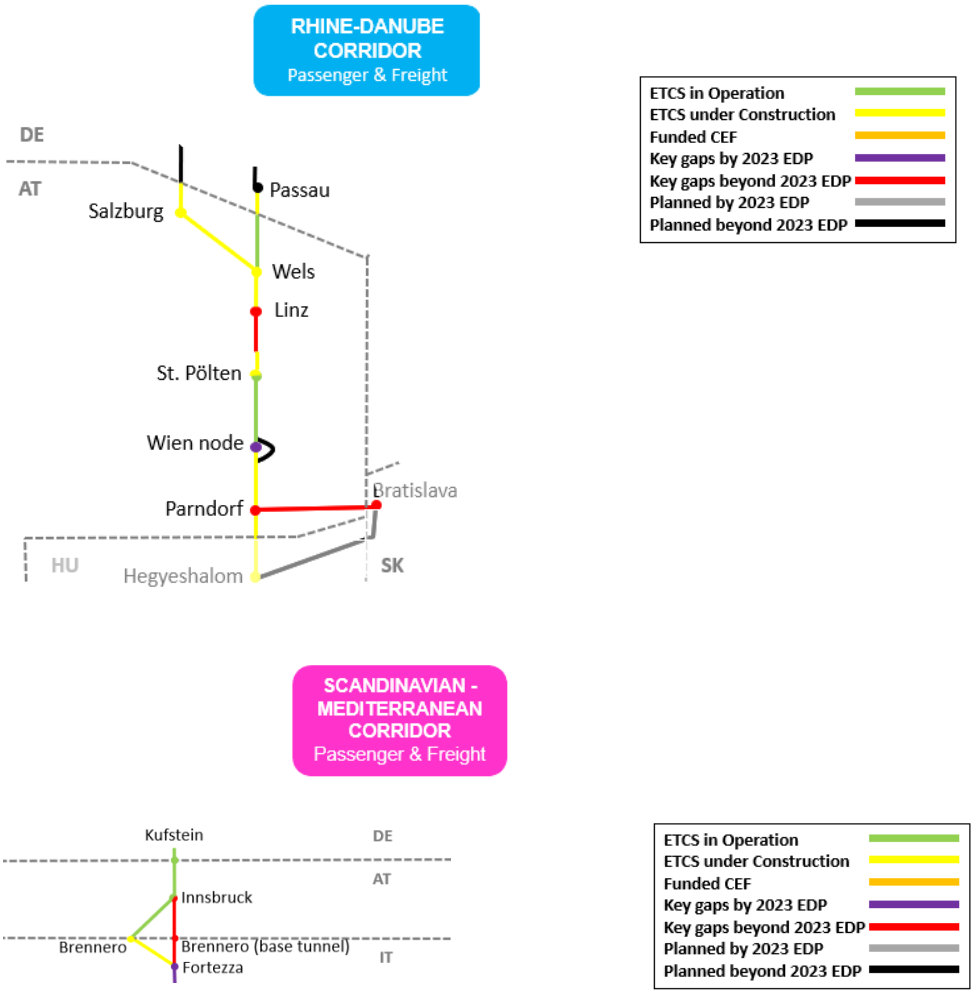
The following table shows all the identified gaps in Austria, i.e. lines that are not in operation, under construction or funded with a CEF project in the CNC. According to the criteria and methodology explained in Section 4, gaps are listed from the highest to the lowest priority gaps. Lines highlighted in blue are the gaps to be prioritised in Austria.

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/ year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Innsbruck - Border AT/IT (Brennero base tunnel) | 78 | SCM | AT | Passenger and freight | 46.9 | 31/12/2030 | X | High(40733) | High(51421) | This section is the high-speed line, although this section is shown with traffic flow, this traffic belongs to the conventional line, because the infrastructure of this section is being building according to reference [3]. In the TENTec Viewer, the conventional line is shown as not belonging to the CNC. Although, in the EDP, it is shown as belonging to the SCM corridor |
| Wien node 2 | 74 | BAC - RDN | AT | Passenger | 9.8 | 31/12/2021 | | Medium (32888) | High(56916) | This section is located within theWien node and connects Suedbahnh to Meidling |
| Linz - Gross Sierning (Knoten Rohr) | 71 | RDN | AT | Passenger and freight | 112.2 | 31/12/2030 | | Medium (30963) | High(54340) | |
| Werndorf - Border AT/ SI (Sentji/Spieldfeld-Strass) | 62 | BAC | AT | Passenger and freight | 30.0 | 31/12/2023 | X | No Traffic Data | No Traffic Data | |
| Parndorf - Border AT/SK (Petrzalka) | 60 | BAC - RDN | AT | Freight | 20.4 | 31/12/2030 | X | Low(11250) | Low(12240) | |
| Wien node 1 | 59 | BAC - RDN | AT | Passenger and freight | 17.0 | 31/12/2030 | | No Traffic Data | No Traffic Data | This section is located within the Wien node and connects Freudenau to Meidling |
| Wien - Border AT/SK (Marchegg) | 50 | BAC | AT | Passenger | 37.2 | 31/12/2023 | X | Low(4051) | Medium (25901) | |
| Graz - Werndorf - Klagenfurt- Border AT/IT (Thoerl-Maglern) | 47 | BAC | AT | Passenger and freight | 195.0 | 31/12/2030 | X | Medium (26223) | Medium (34086) | |
| Wr. Neustadt - Graz | 45 | BAC | AT | Passenger and freight | 149.2 | 31/12/2030 | | Medium (25340) | Medium (31605) | |
| Gramatneusiedl - Wampersdorf | 45 | BAC | AT | Freight | 12.9 | 31/12/2023 | | No Traffic Data | No Traffic Data | |
| Wien - Wampersdorf - Wr. Neustadt | 34 | BAC | AT | Passenger and freight | 46.4 | 31/12/2023 | | No Traffic Data | No Traffic Data | |
| **Total Length not expected** | | | | | **677.0** | | | | | |

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/ year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **in the short (km)** | | | | | | | | | | |
| **Total gap priority (km)** | | | | | **219.2** | | | | | |

### 5.1.1 *Sketch with the priority gaps*






### *5.1.2* ***Priority gaps***

#### *Innsbruck – Border AT/IT (Brennero base tunnel)*

In the Scandinavian – Mediterranean Corridor, there are two lines connecting Austria and Italy, the conventional line, which is already equipped with ETCS in operation, and the high-speed line which crosses both countries via a tunnel, that is currently being built according to reference [3].

Although the conventional line is already equipped with ETCS in operation, the high-speed line should be selected as a priority gap because it will absorb the traffic of the conventional line. Furthermore, the Italian side of the cross-border section is also selected as a priority gap.

#### *Wien node 2: Suedbahnh - Meidling*

This section is located within Wien and links the Wien - St. Pölten line (already with ETCS in operation) with the line connecting Wien - Parndorf - Hungarian border, which is already under construction. Furthermore, this line is the second busiest of the country for both freight and passenger traffic compared to all the lines (including those in operation or under construction) within the CNC.

***Linz - Gross Sierning (Knoten Rohr)***

The Linz - Gross Sierning line belongs to the BAC Corridor. This line should be selected as a priority gap because it connects Germany – Austria – Hungary. Therefore, if this gap is selected as a priority, there will be an ETCS-equipped line crossing the country in the medium term, allowing a continuos connection with the above-mentioned countries. Furthermore, this line is the third busiest of the country for freight traffic.

***Werndorf - Border AT/ SI (Sentji/Spieldfeld-Strass)***

The Werndorf - Border AT/ SI line belongs to BAC and RDN Corridors In the Data set of Rail Traffic data [2] and there is no traffic information available for this section. However, this line is selected because it connects Austria with Slovenia and the section located in Slovenia is already under construction. Furthermore, the length of the gap is relatively small (i.e. 30 km) compared to the other gaps. For these reasons, this line was selected as a priority gap.

***Parndorf - Border AT/SK (Petrzalka)***

The line Parndorf - Border AT/SK belongs to BAC and RDN Corridors. This gap connects the capital city of the country, Wien, with Slovakia. The Slovak section from border to Bratislava was also selected as priority gap. Furthermore, the length of this gap is 20 km.

### *5.2 Belgium*

Belgium has an ETCS deployment category of ETCS network with gaps. This means that a limited number of lines in the CNC in the MS are not expected to be under construction or ETCS in operation in the short term.

According to the EDP, this MS should equip with ETCS 1,281 km of lines belonging to the CNC by 2030. Of this length, 537 km are not expected to be under construction in the short term. The result is the prioritisation of 198 km. The reasons why these gaps were selected as a priority sections are explained below.

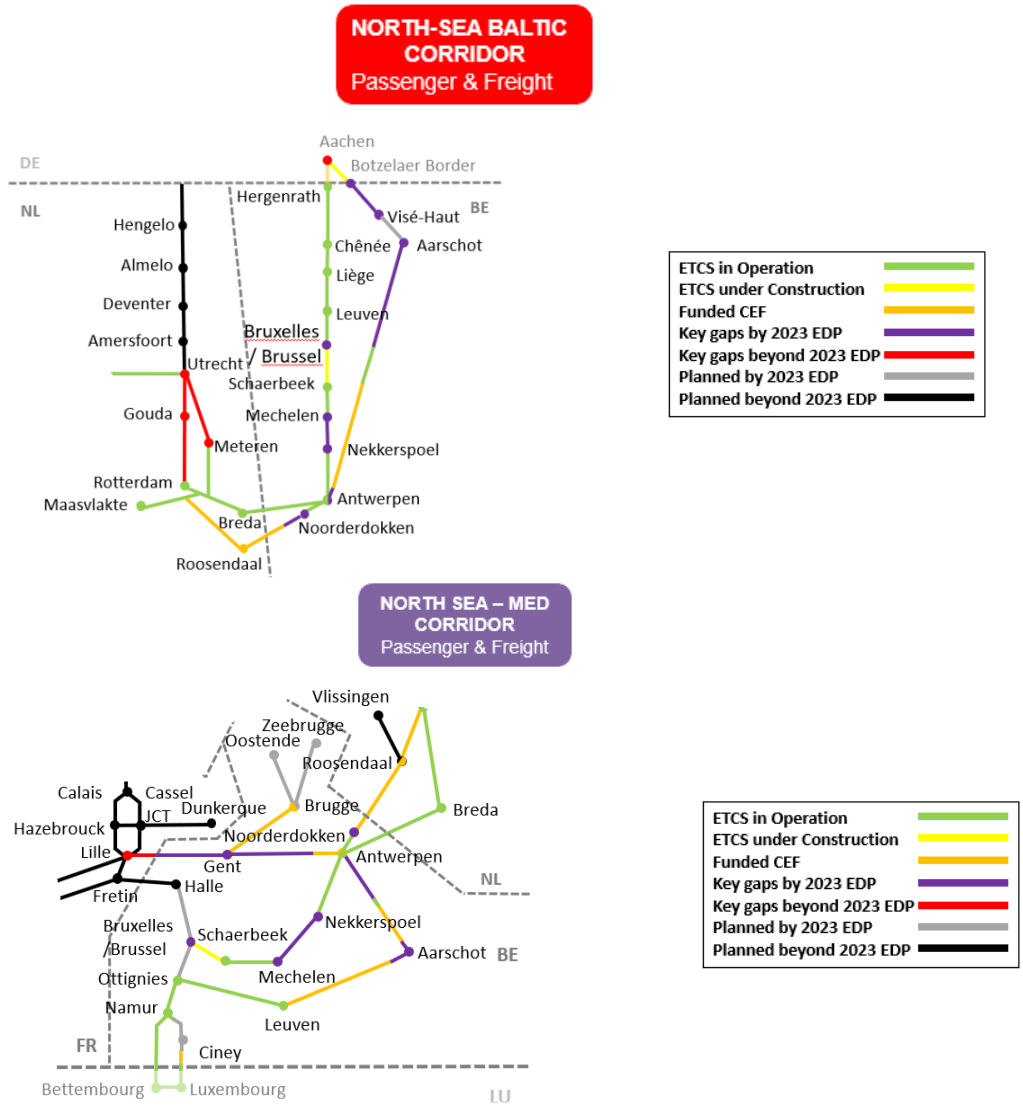
The following table shows all the identified gaps in Belgium, i.e. lines that are not in operation, under construction or funded with a CEF project in CNC. According to the criteria and methodology explained in Section 4, gaps are listed from the highest to the lowest priority gaps. Lines highlighted in blue are the gaps to be prioritised in Belgium.

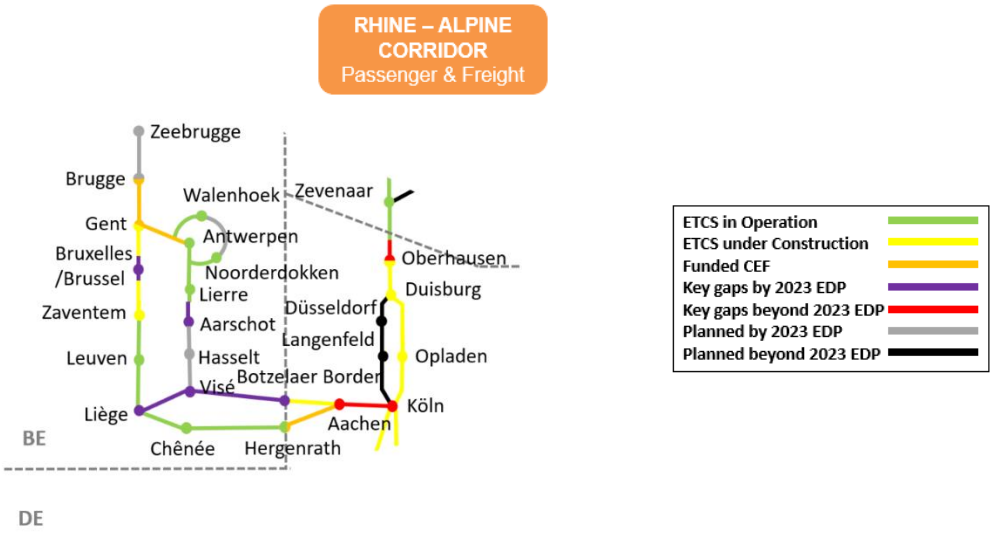
| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Noorderdokken - Border BE/NL (Essen/Roosendaal) | 87 | NSB - NSM | BE | Passenger and freight | 3.5 | 31/12/2020 | X | Medium (6884) | Low (32131) | The total length of the section is 24 km and the rest of the section is already funded by 2016-BE-TM-0298-W |
| Border BE/DE (Botzelaer) - Visé - Liège | 81 | NSB - RALP | BE | Freight | 47.2 | 31/12/2023 | X | High (13757) | Low (5391) | |

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Antwerpen - Aarschot - Leuven | 78 | NSB - RALP - NSM | BE | Freight | 19.4 | 31/12/2023 | | Medium (11142) | Low (28028) | The total length of the section is 59 km, 38 km are funded by 2018-BE-TM-0101-W and 2 km are already in operation. |
| Border FR/BE (Mouscron) - Gent - Antwerpen | 75 | NSM | BE | Freight | 107.3 | 31/12/2024 | X | Medium (7190) | Medium (42248) | The total length of the section is 115, the rest of the section is already funded by 2018-BE-TM-0101-W |
| Bruxelles/Brussels node | 72 | RALP - NSM | BE | Passenger | 19.0 | 31/12/2022 | X | Low (42) | Medium (53370) | This section includes: Gent-Bruxelles /Brussels Bruxelles /Brussels–Zaventem Bruxelles /Brussel-Schaerbeek |
| Mechelen - Nekkerspoel | 65 | NSB - NSM | BE | Passenger | 1.7 | 31/12/2022 | | Low (105) | High (89335) | |
| Antwerpen port | 61 | RALP - NSM | BE | Freight | 15.4 | 31/12/2023 | | Medium (11144) | Low (182) | The total length of the section is 24 km and the rest of the section is already in operation with ETCS |
| Namur - Cigney - Border BE/LU (Luxembourg) | 61 | NSM | BE | Passenger | 87.9 | 31/12/2025 | X | Low (283) | Low (17768) | The total length of this section is 146 km, 6 km are already in operation with ETCS and 52 km are funded by 2016-BE-TM-0298-W |
| Border FR/BE (Wannehein) - Halle - Bruxelles/Brussel | 59 | NSM | BE | Passenger | 86.2 | 31/12/2022 | X | Low (12) | Low (30765) | |
| Bruxelles/Brussel - Ottignies | 58 | NSM | BE | Unselected | 29.1 | 31/12/2024 | | Low (67) | Medium (46382) | |
| Visé-Haut - Hasselt - Aarschot | 54 | NSB - RALP | BE | Freight | 81.5 | 31/12/2025 | | High (13605) | Low (17794) | |

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Zeebruge - Brugge - Gent | 50 | RALP - NSM | BE | Passenger and freight | 17.3 | 31/12/2021 | | Medium (2565) | Low (28235) | The total length of the section is 57 km and the rest of the section is already funded by 2018-BE-TM-0101-W |
| Brugge - Oostende | 47 | NSM | BE | Passenger and freight | 21.0 | 31/12/2021 | | Low (89) | Medium (43059) | |
| **Total Length not expected in the short (km)** | | | | | **536.5** | | | | | |
| **Total gaps priority (km)** | | | | | **198.1** | | | | | |

### *5.2.1 **Sketch with the priority gaps***






### 5.2.2 *Priority gaps*

***Noorderdokken - Border BE/NL (Essen/Roosendaal)***

The Noorderdokken - Border BE/NL (Essen/Roosendaal) line belongs to the NSB and NSM Corridors. This line has 21 km funded by the CEF project 2016-BE-TM-0298-W. However, there are 4 km in this section that are not expected to be under construction in the short term. This section is located in Noorderdokken and is a priority gap because connects the Dutch border with the Antwerpen – Mechelen line, which is already in operation.

***Border BE/DE (Botzelaer) - Visé - Liège***

The Border BE/DE (Botzelaer) - Visé – Liège line belongs to the NSB (only the section Botzelaer – Visé-Haut) and RALP Corridors.

In the RALP Corridor, between Belgium and Germany two lines were planned: one for passengers and the other for freight. Nowadays, the passenger line connecting Hergenrath – Chênée - Liège is already in operation. However, the freight line, connecting Visé – Liège, is not expected to be under construction in the short term. This line should be selected as a priority gap because this line is the first busiest in Belgium for freight traffic compared to the remaining gaps.

***Antwerpen - Aarschot - Leuven***

The Antwerpen - Aarschot – Leuven line belongs to the NSB, RALP and NSM corridor. This line has 59 km already funded by the CEF project 2018-BE-TM-0101-W and 3 km already in operation in the Antwerpen – Aarschot section. This line should be selected as a priority gap because it allows connection of Antwerpen with the Luxemburg network that is already in operation. The length of the gap that is proposed for prioritisation is 19 km.

***Border FR/BE (Mouscron) - Gent - Antwerpen***

The Border FR/BE (Mouscron) - Gent – Antwerpen line belongs to the NSM Corridor. This line has 8 km already funded by the CEF project 2018-BE-TM-0101-W. This section is located in the Antwerpen station. The rest of the line (107 km) is not expected to be under construction in the short term. It is a priority gap because it

connects Belgium and France. Furthermore, the French side of the cross-border section is a priority gap.

***Bruxelles/Brussels node***

The Bruxelles/Brussels node belongs to the NSM and RALP corridor. This line is located in the Brussels node and the sections which connect this node with Gent and Zaventem. This section connects Brugge to Liège.

***Mechelen - Nekkerspoel***

The Mechelen – Nekkerspoel line belongs to the NSB and NSM corridor. The gap is located at the Mechlen node and allows connecting two lines which are already with ETCS in operation: the line connecting Bruxells and the Dutch side of the cross-border section and the line connecting Antwerpen and the German node. Furthermore, this is the busiest line for passenger traffic from all the identified gaps.

## *5.3* ***Bulgaria***

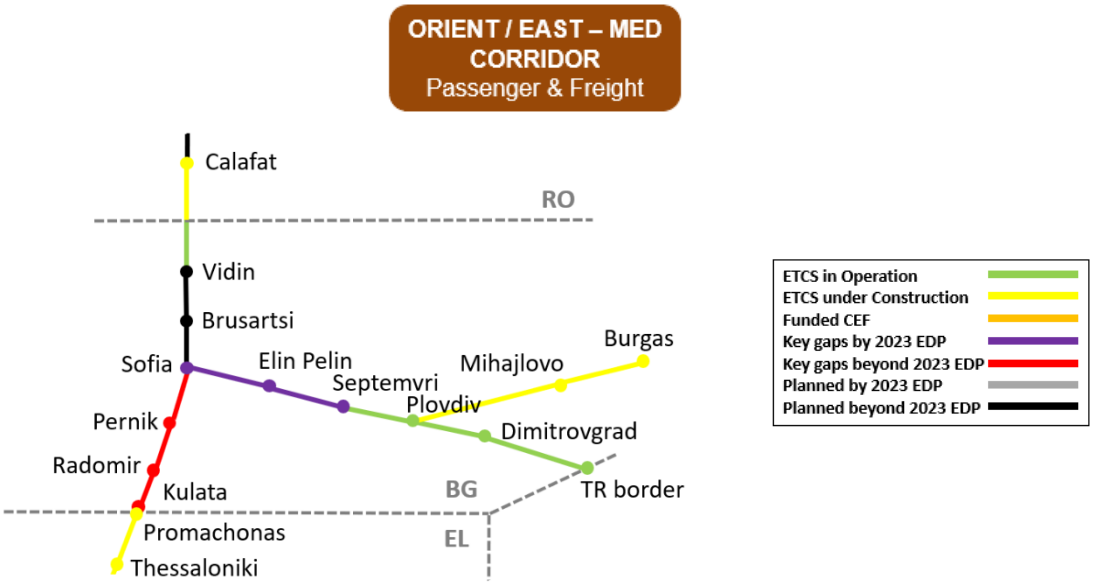
Bulgaria has an ETCS deployment category of ETCS islands, this means that the ETCS deployment focuses on specific sections. In this MS the ETCS deployment is focused on the Septemvri – Turkish border and Plovdiv – Burgas line.

This MS should equip with ETCS 1,107 km of lines belonging to the CNC by 2030. Of this length, 581 km are not expected to be under construction or in operation in the short term. The result is the prioritisation of 313 km. The reasons why these gaps were selected as a priority sections are explained below.

The following table shows all the identified gaps in Bulgaria, i.e. lines that are not in operation, under construction or funded with a CEF project in the CNC. According to the criteria and methodology explained in Section 4, gaps are listed from the highest to the lowest priority gaps. Lines highlighted in blue are the gaps to be prioritised in Bulgaria.

| Lines | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Sofia - Septemvri | 76 | OEM | BG | Passenger and freight | 104.5 | 01/01/2029 | | High (7782) | High (15909) | |
| Sofia - Radomir - Border BG/EL | 56 | OEM | BG | Passenger and freight | 209.3 | 31/12/2030 | X | Medium (3656) | Low (10823) | |
| Vidin - Brusartsi - Sofia | 34 | OEM | BG | Passenger and freight | 267.8 | 31/12/2030 | | Low (2380) | Low (9951) | |
| **Total Length not expected in the short (km)** | | | | | **581.6** | | | | | |
| **Total gaps priority (km)** | | | | | **313.8** | | | | | |

### 5.3.1 *Sketch with the priority gaps*




### 5.3.2 *Priority gaps*

***Sofia - Septemvri***

The Sofia – Septemvri line belongs to the OEM Corridor. The line between the Turkish border and Septemvri is currently in operation with ETCS Level 1. The section connecting Septemvri and Sofia is not expected to be under construction in the short term in the country. This section connects Sofia with the Turkish border. In addition, according to the traffic data this line is the busiest in the country for both freight and passengers.

***Sofia - Radomir - Border BG/EL***

The Sofia - Radomir - Border BG/EL line belongs to the OEM Corridor. This line may be considered as a potential gap because it connects Greece and the capital city of Bulgaria, Sofia. In addition, this line is the second busiest in the country for both freight and passengers. The Greek side of the cross-border section is under construction.

## *5.4 Croatia*

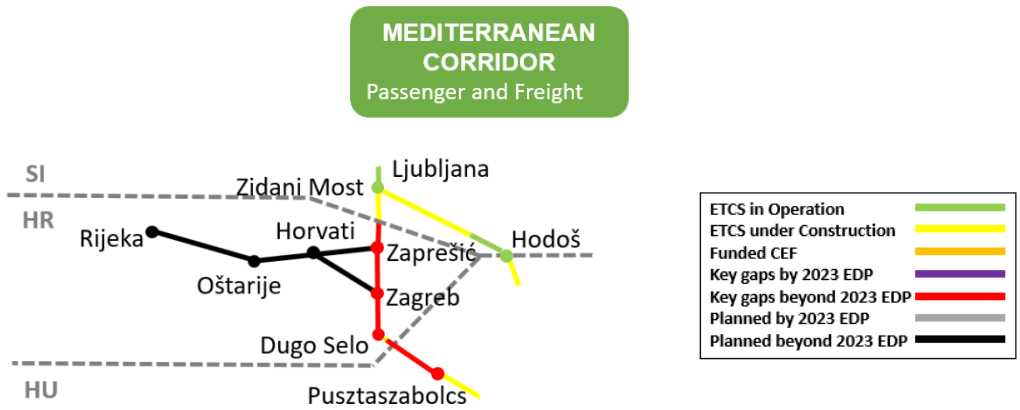
According to the EDP [4], no lines in Croatia will be equipped with ETCS before 2023. For this reason, currently there are no ETCS lines in operation in this country and 79 km are being equipped with ETCS.

As stated by the EDP, this MS should equip 469 km of lines belonging to the CNC with ETCS by 2030. Of this length, 429 km are not expected to be under construction or in operation in the short term. The result is the prioritisation of 87 km. The reasons why these gaps were selected as priority sections are explained below.

The following table shows all the identified gaps in Croatia, i.e. lines that are not in operation, under construction or funded with a CEF project in CNC. According to the criteria and methodology explained in Section 4, gaps are listed from the highest to the lowest priority gaps. Lines highlighted in blue are the gaps to be prioritised in Croatia.

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Zaprešić - Zagreb - Dugo Selo – Border HU/HR | 80 | MED | HR | Passenger | 71.3 | 31/12/2026 | X | High (9598) | High (19912) | |
| Border SI/HR (Dobova/Savski) - Zaprešić | 65 | MED | HR | Passenger and freight | 15.3 | 31/12/2025 | X | Low (6715) | High (19286) | |
| Horvati - Dugo Selo | 46 | MED | HR | Freight | 47.5 | 31/12/2030 | | Medium (7501) | Medium (12151) | |
| Zaprešić - Horvati | 41 | MED | HR | Passenger and freight | 10.7 | 31/12/2030 | | Medium (7408) | High (17594) | |
| Horvati - Oštarije - Rijeka | 28 | MED | HR | Passenger and freight | 283.8 | 31/12/2028 | | Medium (7198) | Medium (8430) | |
| **Total Length not expected in the short (km)** | | | | | **428.6** | | | | | |
| **Total gaps priority (km)** | | | | | **86.6** | | | | | |

5.4.1 ***Sketch with the priority gaps***




5.4.2 ***Priority gaps***

***Zaprešić - Zagreb - Dugo Selo - Border HU/HR***

The Zaprešić - Zagreb - Dugo Selo line belongs to the MED Corridor. This line is the busiest line in the country for both passengers and freight and connects the Hungarian border with the capital city.

***Border SI/HR (Dobova/Savski) - Zaprešić***

The Border SI/HR (Dobova/Savski) - Zaprešić line belongs to the MED Corridor. This line connects Croatia with Slovenia and the Slovenian side is already under construction. In addition, this line is one of the busiest in the country for both passengers and freight.

### *5.5 Czechia*

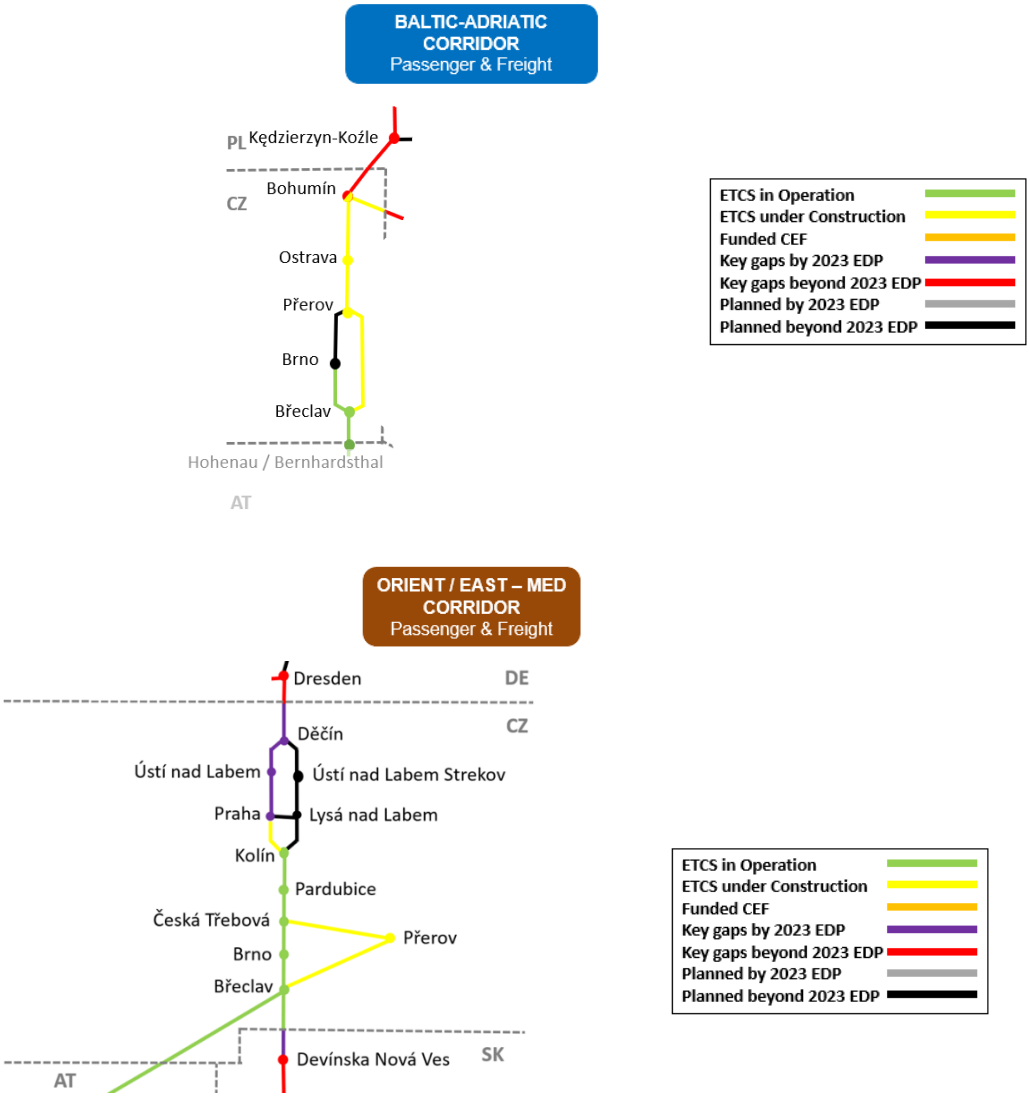
Czechia has a mix of ETCS deployment categories. On the one hand, the ETCS deployment of the OEM and RDN Corridors has the ETCS island category, because it is focused on specific areas as shown in the sketch of the section 5.5.1. On the other hand, the ETCS deployment of the BAC Corridor has a limited number of lines that are not expected to be under construction in the short term (i.e. ETCS network with gaps). In this case, only the Prerov – Brno line and the border with Poland are not expected to be under construction in the short term.

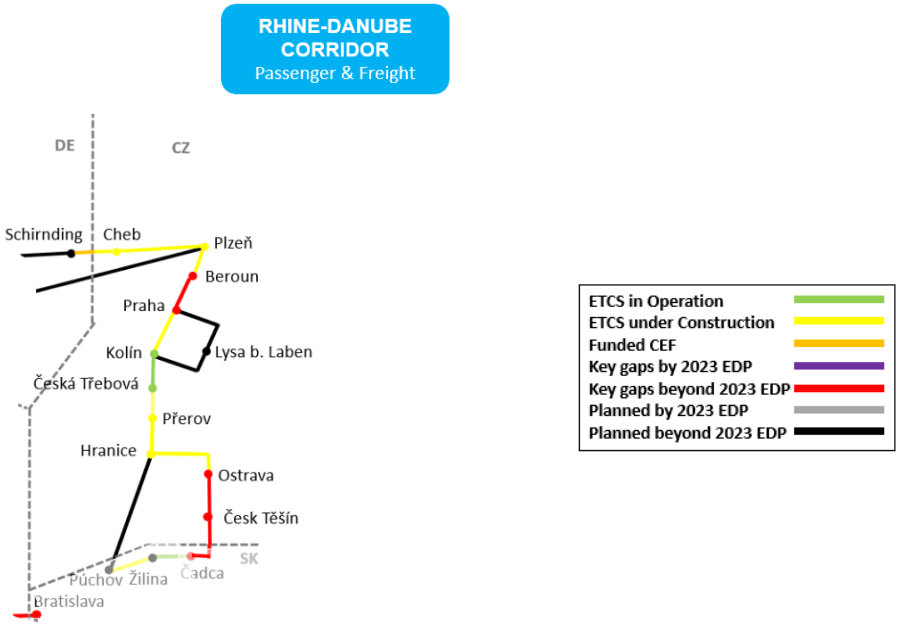
According to the EDP, this MS should equip with ETCS 1,545 km of lines belonging to the CNC by 2030. Of this length, 724 km are not expected to be under construction or in operation in the short term. The result is the prioritisation of 236 km. The reasons why these gaps were selected as a priority sections are explained below.

The following table shows all the identified gaps in Czechia, i.e. lines that are not in operation, under construction or funded with a CEF project in the CNC. According to the criteria and methodology explained in Section 4, gaps are listed from the highest to the lowest priority. Lines highlighted in blue are the gaps to be prioritised in Czechia.

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Ostrava – Český Těšín – Border CZ/SK (Mosty u Jablunkova) | 80 | RDN | CZ | Passenger | 69.5 | 31/12/2030 | X | High (33382) | Medium (55883) | |
| Border DE/CZ (Bundesgrenze) – Děčín – Praha | 78 | OEM | CZ | Passenger and freight | 110.8 | 31/12/2023 | X | High (33317) | Medium (53468) | |
| Border PL/CZ (Raciborz) – Bohumin | 71 | BAC | CZ | Passenger and freight | 5.5 | 31/12/2030 | X | Medium (10241) | Low (3201) | |
| Beroun – Praha | 71 | RDN | CZ | Passenger and freight | 49.8 | 31/12/2030 | | Medium (9694) | High (94546) | |
| Hranice – Border CZ/SK (Hranice/Púchov) | 66 | RDN | CZ | Freight | 68.8 | 31/12/2030 | X | Medium (11137) | Medium (36120) | |
| Praha – Lysa n. Labem | 63 | OEM – RDN | CZ | Freight | 30.5 | 31/12/2023 | | Low (3964) | Medium (68813) | |
| Děčín – Ústí n. Labern Strekov – Lysá n.Labem (Praha) – Kolín | 53 | OEM – RDN | CZ | Freight | 160.4 | 31/12/2030 | | High (35441) | Low (32150) | |
| Border DE/CZ (Furth im Wald/Ceska Kubice) – Plzeň | 53 | RDN | CZ | Passenger and freight | 71.5 | 31/12/2030 | X | Low (2835) | Low (21127) | |
| Prerov – Brno | 51 | BAC | CZ | Freight | 78.8 | 31/12/2030 | | Medium (9448) | Low (0) | |
| Prerov – Brno (HS) | 49 | BAC | CZ | Passenger | 78.8 | 31/12/2030 | | Low (0) | Low (31783) | |
| **Total Length not expected in the short (km)** | | | | | **724.4** | | | | | |
| **Total gaps priority (km)** | | | | | **235.6** | | | | | |

### 5.5.1 *Sketch with the priority gaps*






### 5.5.2 *Priority gaps*

#### *Ostrava – Český Těšín – CZ/SK border (Mosty u Jablunkova)*

The Ostrava – Český Těšín – CZ/SK border (Mosty u Jablunkova) line belongs to the RDN Corridor. This line should be selected as a priority gap because it connects Czechia with Slovakia and it is the second busiest for freight compared to the rest of gaps. Furthermore, the Slovakian side of the cross-border section has been also selected as a priority gap.

#### *DE/CZ border (Bundesgrenze) – Děčín – Praha*

The DE/CZ border (Bundesgrenze) – Děčín – Praha line belongs to the OEM and RDN (only Praha) Corridors. This line connects Germany with Czechia and closes the gap with the line that connects to Slovakia (i.e. Praha – Slovakian border). For this reason, it should be selected as a priority gap.

#### *PL/CZ border (Raciborz) – Bohumin*

The PL/CZ border (Raciborz) – Bohumin line belongs to the BAC Corridor. This line should be selected as a priority gap because it connects Poland with Czechia and closes the gap with the line that connects to the Austrian border (i.e. Bohumín – Hohenau/Bernhardsthal). Furthermore, the Polish side of the cross – border has also been selected as a priority gap.

#### *Beroun – Praha*

The Beroun – Praha line belongs to the RDN Corridor. This line is a priority gap because it closes the gap between the German Border (Cheb) and Praha. In addition, this line closes the gap between Praha and Ostrava.

Furthermore, this line is the third busiest for passenger traffic in the country compared to all lines (included ETCS in operation, ETCS under construction or funded by a CEF project) within the CNC.

### 5.6 *Denmark*

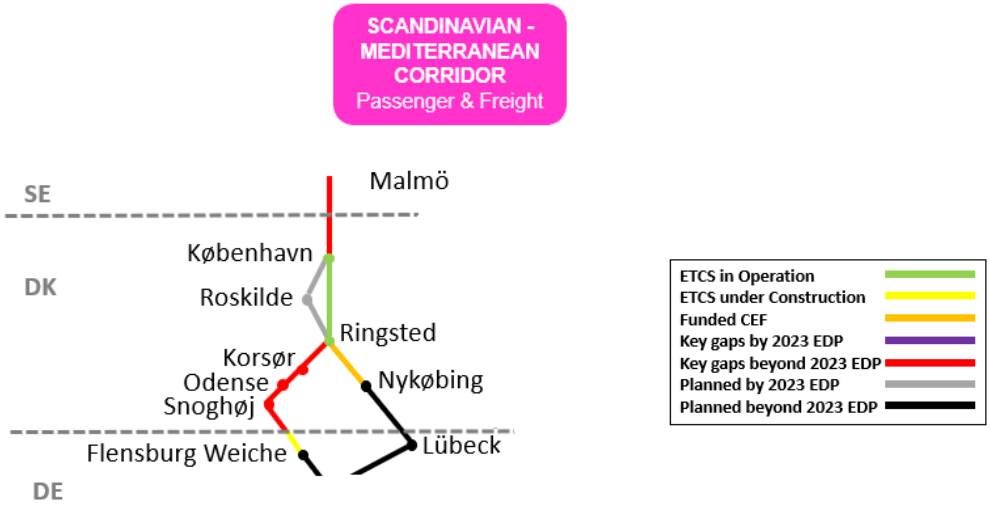
Denmark has an ETCS deployment category of ETCS island, this means that the ETCS deployment focuses on specific areas. In this MS, the focus is on the line connecting the capital city, København (Copenhagen) and Ringsted.

According to the EDP, this MS should equip with ETCS 549 km of lines belonging to the CNC by 2030. Of this length, 405 km are not expected to be under construction or in operation in the short term. The result is the prioritisation of 291 km. The reasons why these gaps were selected as a priority sections are explained below.

The following table shows all the identified gaps in Denmark, i.e. lines that are not in operation, under construction or funded with a CEF project in the CNC. According to the criteria and methodology explained in Section 4, gaps are listed from the highest to the lowest priority gaps. Lines highlighted in blue are the gaps to be prioritised in Denmark.

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/ year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Border SE/DK (Malmö) – København | 83 | SCM | DK | Passenger and freight | 31.3 | 31/12/2025 | X | Medium (6993) | High (64732) | |
| Ringsted – Snoghøj – Border DK/DE (Padborg) | 72 | SCM | DK | Passenger and freight | 259.9 | 31/12/2028 | X | High (10316) | Medium (31885) | |
| København – Ringsted | 71 | SCM | DK | Passenger and freight | 68.9 | 31/12/2029 | | High (10024) | Low (8626) | |
| Nykøbing – Border DK/DE (Puttgarden) | 59 | SCM | DK | Passenger and freight | 44.8 | 31/12/2030 | X | Low (34) | Low (5095) | |
| **Total Length not expected in the short (km)** | | | | | **404.9** | | | | | |
| **Total gaps priority (km)** | | | | | **291.1** | | | | | |

#### 5.6.1 *Sketch with the priority gaps*



### *5.6.2 **Priority gaps***

#### ***Border SE/DK (Malmö) – København***

The Border SE/DK (Malmö) – København line belongs to the SCM Corridor. This line should be selected as a priority gap because it is short (31 km) in comparison with the rest of the gaps and also because it links the capital city of Denmark and Sweden.

#### ***Ringsted – Snoghøj – Border DK/DE (Padborg)***

The Ringsted – Snoghøj – Border DK/DE (Padborg) line belongs to the SCM Corridor. This line may be a potential gap in the network because it connects Denmark with Germany and it is one of the busiest lines in the country for both passengers and freight traffic. In addition, the German section is already under construction. Furthermore, this line is the busiest line of the country for freight traffic. For these reasons, this line should be selected as a priority gap.

## *5.7 **Estonia***

Estonia has no ETCS lines in operation, under construction or with CEF projects assigned. In addition, the only connection that exists with the rest of the European railway network is through Latvia and Lithuania, which are both in the same situation. All the Estonian lines included in the CNC are planned beyond 2023 (167 km) and some of them are exempt from implementing ETCS even beyond 2030 (275 km). Therefore, the whole railway network has been included as a gap.

The following table shows all the identified gaps in Estonia, i.e. lines that are not in operation, under construction or funded with a CEF project in the CNC. According to the criteria and methodology explained in Section 4, gaps are listed from the highest to the lowest priority gaps. Lines highlighted in blue are the gaps to be prioritised in Estonia.

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Tallinn – Valga (border EE/LV) | 65 | NSB | EE | Passenger and freight | 275.1 | Beyond 2030 | X | High (2055) | High (5552) | Conventional line |
| Tallinn - Border EE/LV (Moisakula) | 47 | NSB | EE | Passenger and freight | 166.6 | 31/12/2026 | X | No Traffic Data | No Traffic Data | This is the high-speed line belonging to the Rail Baltica |
| **Total Length not expected in the short (km)** | | | | | **441.7** | | | | | |
| **Total gaps priority (km)** | | | | | **166.6** | | | | | |

### 5.7.1 *Sketch with priority gaps*


### 5.7.2 *Priority gaps*

***Tallinn - Border EE/LV (Moisakula)***

In the North Baltic Sea, there are two lines connecting Estonia and Latvia: the conventional Tallinn - Valga (EE / LV border) line and the high-speed Tallinn - EE / LV Border (Moisakula) line, which is part of Rail Baltica.

Although the conventional line has a higher score because the infrastructure is already built and there is information about its traffic flow, the high-speed Tallinn - Border EE/LV (Moisakula) line should be selected as a priority gap. This is because it belongs to Rail Baltica and in the future this section will absorb the traffic of the conventional line. Furthermore, this section would allow direct connections between Tallinn and the Polish border, via Latvia and Lithuania.

## 5.8 *Finland*

Finland is not connected to mainland Europe by railway. However, there are lines within the country that form part of the NSM Corridor.

Finland does not have any ETCS line in operation, under construction or funded. This is due to the fact that all the lines are planned in the EDP beyond 2023.

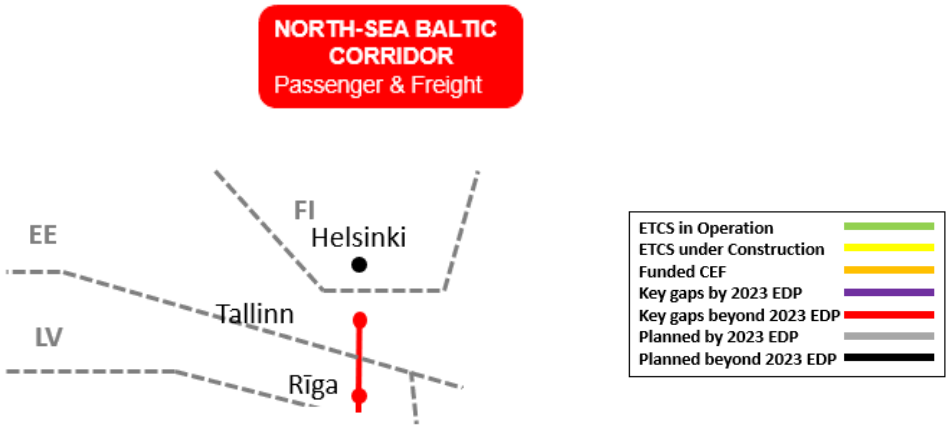
According to the EDP, this MS should equip 510 km of lines belonging to the CNC with ETCS. No specific gaps are identified in this proposal given that Finland has no lines under construction or providing commercial services yet. For this reason, Finland has the ETCS deployment category of "No ETCS". Despite this, 90 km were assigned a higher priority than the rest of gaps inside the MS. The reasons why this gap is selected as a priority sections are explained below.

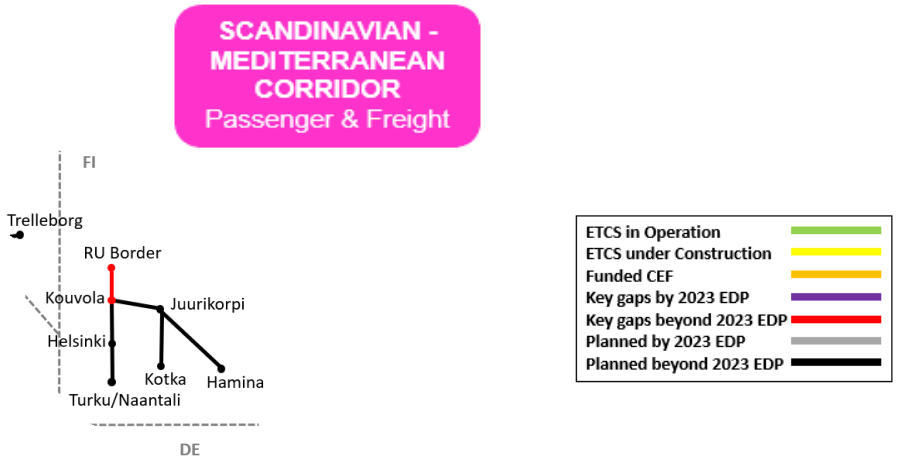
The following table shows all the identified gaps in Finland, i.e. lines that are not in operation, under construction or funded with a CEF project in the CNC. According to the criteria and methodology explained in Section 4, gaps are listed from the highest to the lowest priority gaps. Lines highlighted in blue are the gaps to be prioritised in Finland.

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Border RU/FI (Vainikkala) - Kouvola | 64 | SCM | FI | Passenger and freight | 90.4 | Beyond 2030 | X | High (5115) | Low (3766) | |

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Juurikorpi - Kotka | 54 | SCM | FI | Freight | 15.2 | Beyond 2030 | | Medium (4001) | Low (2080) | |
| Kouvola – Juurikorpi - Hamina | 50 | SCM | FI | Freight | 52.4 | Beyond 2030 | | Medium (3628) | Low (1395) | |
| Helsinki | 48 | NSB | FI | Passenger and freight | 3.4 | Beyond 2030 | | Low (0) | High (175351) | |
| Kouvola - Helsinki | 36 | SCM | FI | Passenger and freight | 160.0 | Beyond 2030 | | Medium (1622) | Low (21625) | |
| Helsinki - Turku/Naantali | 29 | SCM | FI | Passenger and freight | 188.1 | Beyond 2030 | | Low (108) | Low (6006) | |
| **Total Length not expected in the short (km))** | | | | | **509.5** | | | | | |
| **Total gaps priority (km)** | | | | | **90.4** | | | | | |

### *5.8.1* ***Sketch with the priority gaps***






### *5.8.2* ***Priority gaps***

***Border RU/FI (Vainikkala) – Kouvola***

This line belongs to the SCM Corridor and is identified as a priority gap because it is the busiest line for freight traffic in the country. However, this line would be an ETCS island in Finland.

## *5.9* ***France***

France has an ETCS deployment category of ETCS islands, this means that the ETCS deployment focuses on specific areas as shown in the sketch in section 5.9.1.

According to the EDP, this MS should equip with ETCS 6,938 km of lines belonging to the CNC by 2030. Of this length, 5,837 km are not expected to be under construction or in operation in the short term. The result is the prioritisation of 973 km. The reasons why these gaps were selected as a priority sections are explained below.

The following table shows all the identified gaps in France, i.e. lines that are not in operation, under construction or funded with a CEF project in the CNC. According to the criteria and methodology explained in Section 4, gaps are listed from the highest to the lowest priority gaps. Lines highlighted in blue are the gaps to be prioritised in France.

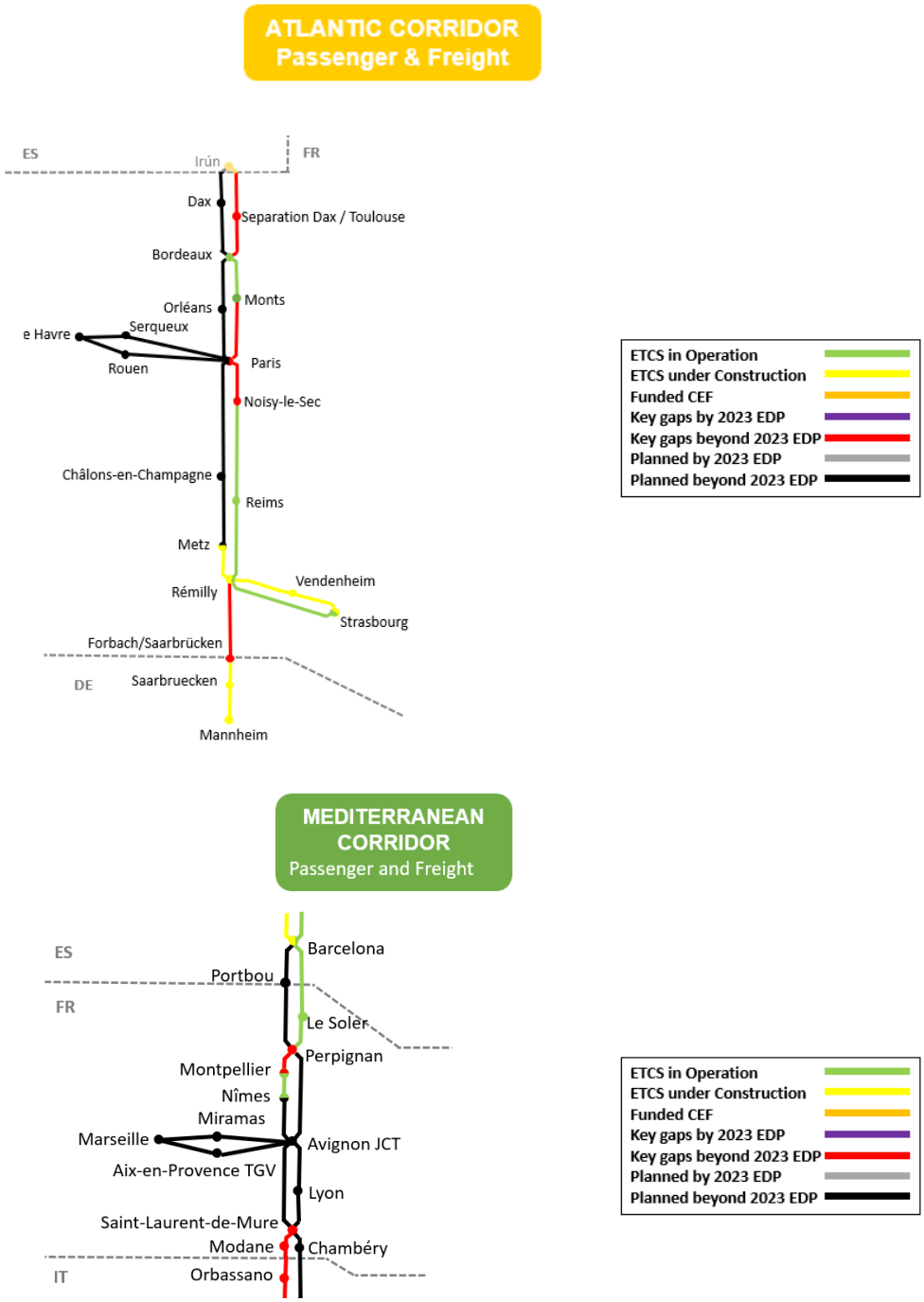
| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/ year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Rémilly - Border FR/DE (Bundergrenze) | 83 | ATL | FR | Passenger and freight | 48.9 | 31/12/2030 | X | Medium (10950) | Low(7300) | |
| Lille - Border FR/BE (Mouscron) | 80 | NSM | FR | Freight | 13.8 | 31/12/2030 | X | Medium (7300) | Low(9125) | |
| Border UK/FR (Calais) - Cassel JCT - Lille | 67 | NSM | FR | Passenger | 125.3 | 31/12/2030 | X | High(13529) | Medium (32815) | This section is funded by 2018-FR-TM-0098-S. However, this CEF project is a study that does not include |

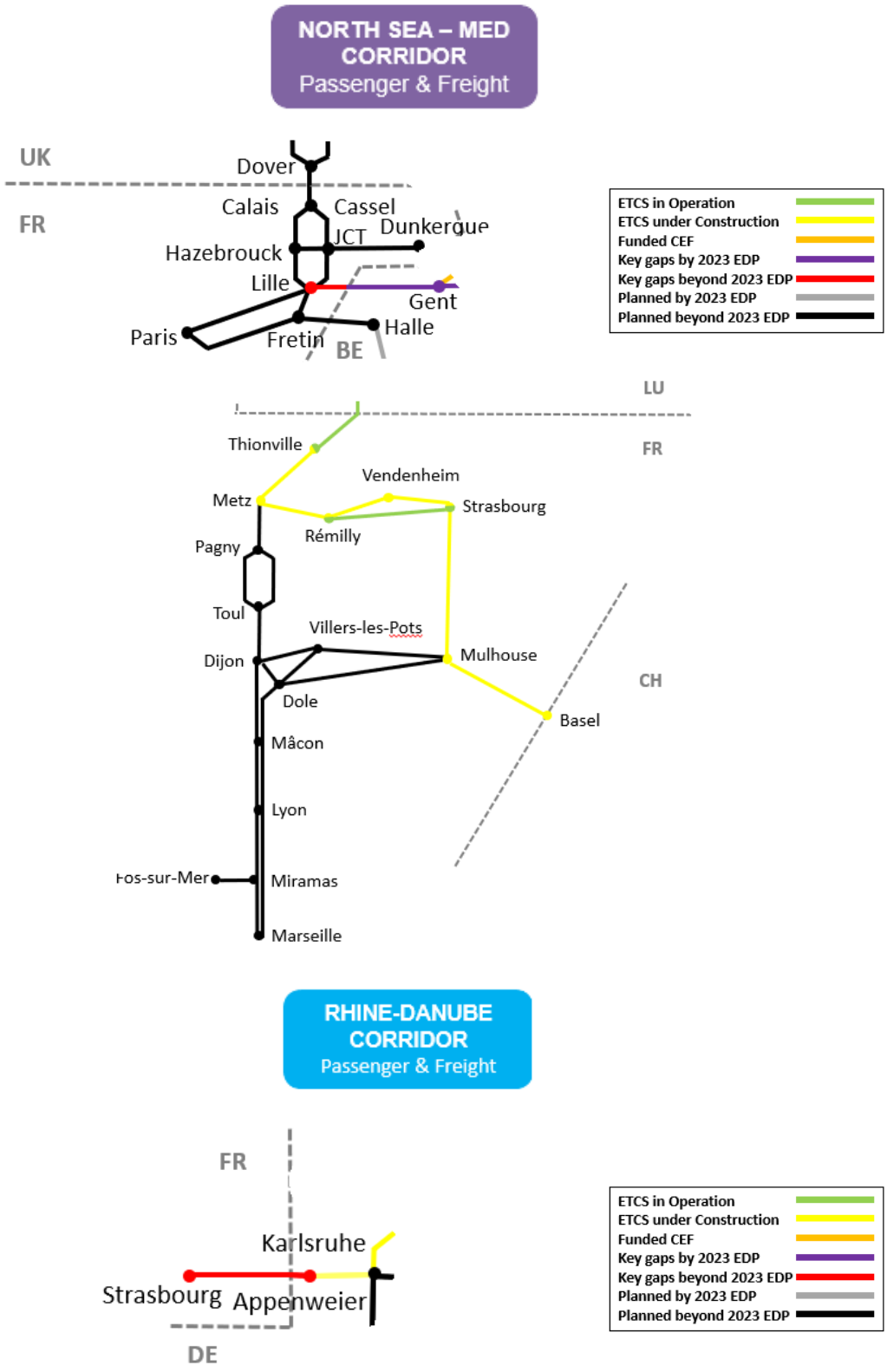
| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/ year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | construction works |
| Strasbourg - Border FR/DE (Strasbourg/Kehl) | 66 | RDN | FR | Passenger and freight | 10.0 | 31/12/2030 | X | No Traffic Data | No Traffic Data | |
| Border ES/FR (Portbou) - Perpignan | 61 | MED | FR | Freight | 41.8 | 31/12/2030 | X | Medium (5475) | Low(7300) | |
| Perpignan - Montpellier | 59 | MED | FR | Passenger | 193.5 | 31/12/2030 | | Medium (11112) | Low(21251) | This section is a New Construction and does not have any Data Traffic, but in the future this section will absorb the traffic of the Perpignan - Avignon JCT line |
| Saint-Laurent-de-Mure - Chambéry - Border FR/IT | 59 | MED | FR | Unselected | 192.2 | 31/12/2030 | X | Medium (5961) | Low(17375) | This section is the conventional line, the priority gap selected is the High-Speed line |
| Irún (Border ES/FR) - Separation Dax/Tolouse - Bordeaux | 58 | ATL | FR | Passenger | 238.8 | 31/12/2030 | X | No Traffic Data | No Traffic Data | |
| Monts - Paris - Noisy-Le-Sec | 57 | ATL | FR | Passenger | 307.7 | 31/12/2030 | | Low(766) | High(49015) | Sections included within Paris which belong to the High-speed line and the section connecting with the airport |
| Dijon - Mâcon | 57 | NSM | FR | Freight | 125.2 | 31/12/2030 | | High(14897) | Medium (25372) | |
| Paris | 57 | ATL | FR | Passenger | 59.9 | 31/12/2030 | | Medium (3466) | Medium (40397) | Sections included within Paris which belong to the conventional lines |
| Orléans - Paris (Noisy-le-Sec) | 57 | ATL | FR | Freight | 134.2 | 31/12/2030 | | High(13483) | Low(13092) | |
| Fretin - Border FR/BE (Wannehein) | 55 | NSM | FR | Passenger | 9.9 | 31/12/2030 | X | Low(0) | Low(18250) | |
| Paris (Noisy-le-Sec) - Châlons-en-Champagne - Metz | 55 | ATL - NSM | FR | Freight | 329.6 | 31/12/2030 | | Medium (11549) | Low(7775) | |
| Hazebrouck II - Dunkerque | 54 | NSM | FR | Freight | 39.1 | 31/12/2030 | | Medium (10585) | Low(15330) | |

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/ year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Irún (Border ES/FR) - Dax - Bordeaux | 54 | ATL | FR | Freight | 232.9 | 31/12/2030 | X | Medium (4804) | Low(16795) | |
| Paris - Lille | 53 | NSM | FR | Passenger and freight | 298.3 | 31/12/2030 | | Medium (8826) | Low(11793) | |
| Mâcon - Lyon | 53 | NSM | FR | Freight | 69.9 | 31/12/2030 | | High(14965) | Medium (27531) | |
| Nîmes - Avignon JCT | 52 | MED | FR | Passenger | 39.6 | 31/12/2030 | | Low(1891) | Low(21196) | |
| Perpignan - Avignon JCT | 51 | MED | FR | Freight | 250.5 | 31/12/2030 | | Medium (11112) | Low(21251) | |
| Paris - Fretin - Lille | 51 | NSM | FR | Passenger | 227.0 | 31/12/2030 | | Low(0) | High(63149) | |
| Saint-Laurent-de-Mure - Chambéry - Border FR/IT (Modane) | 50 | MED | FR | Passenger and freight | 160.3 | 31/12/2030 | X | No Traffic Data | No Traffic Data | This section is the high-speed line |
| Metz - Pagny - Toul - Dijon | 49 | NSM | FR | Passenger | 271.4 | 31/12/2030 | | High(13098) | Low(6972) | |
| Dijon - Villers-les-Pots - Mulhouse | 48 | NSM | FR | Passenger | 138.9 | 31/12/2030 | | Low(0) | Low(13140) | |
| Dijon - Dole - Mulhouse | 46 | NSM | FR | Freight | 261.3 | 31/12/2030 | | Low(1095) | Low(14915) | |
| Border UK/FR (Calais) - Hazebrouck - Lille | 46 | NSM | FR | Freight | 102.5 | 31/12/2030 | X | Low(1825) | Low(17539) | |
| Paris (St. Lazare) - Rouen | 42 | ATL | FR | Freight | 135.6 | 31/12/2030 | | Medium (4456) | Low(11092) | |
| Lyon - Miramas - Marseille | 41 | NSM | FR | Freight | 365.7 | 31/12/2030 | | Medium (8384) | Low(8318) | This section also connects Avignon JCT - Lyon |
| Miramas - Fos-sur-Mer | 41 | NSM | FR | Freight | 19.4 | 31/12/2030 | | Low(730) | Low(3650) | |
| Bordeaux - Orléans | 40 | ATL | FR | Freight | 462.1 | 31/12/2030 | | Medium (7830) | Low(10164) | |
| Paris (Noisy-le-Sec) - Serqueux - Le Havre | 38 | ATL | FR | Freight | 223.8 | 31/12/2030 | | Medium (2672) | Low(4831) | |
| Lyon - Marseille (High speed) | 37 | MED - NSM | FR | Passenger | 301.0 | 31/12/2030 | | Low(0) | Medium (43760) | |
| Paris (St. Lazare) - Rouen - Le Havre | 29 | ATL | FR | Passenger | 198.0 | 31/12/2030 | | No Traffic Data | No Traffic Data | |
| Dijon - Lyon | 29 | NSM | FR | Passenger | 209.8 | 31/12/2030 | | No Traffic Data | No Traffic Data | |
| **Total Length not expected in the short (km)** | | | | | **5.837.9** | | | | | |

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/ year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total gaps priority (km)** | | | | | **973.0** | | | | | |

### *5.9.1 Sketch with the priority gaps*




NORTH SEA – MED CORRIDOR
Passenger & Freight
UK
FR
Dover
Calais
Cassel
Dunkerque
JCT
Hazebrouck
Lille
Gent
Paris
Fretin
Halle
BE
ETCS in Operation
ETCS under Construction
Funded CEF
Key gaps by 2023 EDP
Key gaps beyond 2023 EDP
Planned by 2023 EDP
Planned beyond 2023 EDP
LU
FR
Thionville
Vendenheim
Metz
Strasbourg
Rémilly
Pagny
Toul
Villers-les-Pots
Dijon
Mulhouse
CH
Dole
Basel
Mâcon
Lyon
Fos-sur-Mer
Miramas
Marseille
RHINE-DANUBE CORRIDOR
Passenger & Freight
FR
Karlsruhe
Strasbourg
Appenweier
DE
ETCS in Operation
ETCS under Construction
Funded CEF
Key gaps by 2023 EDP
Key gaps beyond 2023 EDP
Planned by 2023 EDP
Planned beyond 2023 EDP

### *5.9.2 **Priority gaps***

#### ***Rémilly - Border FR/DE (Bundergrenze)***

The Rémilly - Border FR/DE (Bundergrenze) line belongs to the ATL Corridor. This should be selected as a priority gap because this line connects France and Germany. Furthermore, the German side is already under construction.

#### ***Lille - Border FR/BE (Mouscron)***

The Lille - Border FR/BE (Mouscron) line belongs to the NSM Corridor. This line should be selected as a priority gap because it connects France and Belgium. Furthermore, the Belgium side of the cross-border section has also been selected as a priority gap.

#### ***Strasbourg - Border FR/DE (Strasbourg/Kehl)***

The Strasbourg - Border FR/DE (Strasbourg/Kehl) line belongs to the RDN Corridor. This line connects France and Germany and it is small in length (10 km) compared to the rest of the gaps. For these reasons, this section should be selected as a priority gap.

#### ***Saint-Laurent-de-Mure - Chambéry - Border FR/IT (Modane)***

Inside the MED Corridor there are two lines connecting France with the Italian border: the conventional line (Saint-Laurent-de-Mure - Chambéry - Border FR/IT) where infrastructure has already been built and the high-speed line (Saint-Laurent-de-Mure - Chambéry - Border FR/IT (Modane)), which is a new construction intended to have mixed traffic (passengers and freight).

Although the conventional line has a higher score in the table above given that the infrastructure is already built, the high-speed line Saint-Laurent-de-Mure - Chambéry - Border FR/IT (Modane) should be selected as a priority gap. This is because this line will absorb the traffic of the conventional one in the future since it is intended to have mixed traffic. Furthermore, this line connects France and Italy and the Italian side of the cross-border section has also been selected as a priority gap.

#### ***Perpignan – Montpellier***

The Perpignan – Montpellier line belongs to the MED Corridor. This line is not built yet, which is why there is no data traffic information available. However, this line will absorb the traffic of the conventional Perpignan Avignon JCT line, becoming a priority gap (based on this new traffic flow) when applying the criteria explained in Section 3. Furthermore, this line connects the Perpignan – Spanish border and the Nîmes - Perpignan lines, both with ETCS in operation.

#### ***Irún (Border ES/FR) - Separation Dax/Tolouse - Bordeaux***

In the Atlantic Corridor there are two lines connecting Spain and France: the expected high-speed line linking Irún (ES/FR border) - Separation Dax/Tolouse - Bordeaux, which will be for passengers only, and the existing conventional line between Irún (Border ES/FR) - Dax – Bordeaux, for freight traffic only.

The high-speed line should be selected as a priority gap because it connects the Spanish border with the high-speed Bordeaux – Monts line that has ETCS in operation already. In addition, the high-speed line is intended to absorb the passenger traffic flow of the conventional line in the future.

***Monts - Paris - Noisy-Le-Sec***

The Monts - Paris - Noisy-Le-Sec line belongs to the ATL Corridor. This section should be selected as a priority gap, because It connects the Bordeaux – Monts and Noisy-Le-Sec – Rémilly line, both with ETCS in operation. Furthermore, this section is one of the busiest gaps for passenger traffic.

#### *5.9.3 **Gaps discarded***

This section describes the lines which have a high score according to the methodology explained in Section 3 but that are, however, rejected for the reasons stated below.

***Border UK/FR (Calais) - Cassel JCT - Lille***

The Border UK/FR (Calais) - Cassel JCT – Lille line belongs to the NSM Corridor. This section is financed by the CEF project 2018-FR-TM-0098-S. The aim of this project is to prepare preliminary studies for the ERTMS deployment, so there is no construction civil work leading to an ETCS implementation. Therefore, it is not expected that this section will be in operation with ETCS in the short term, so this section remains a gap in the network.

This line was initially selected as a priority gap because it connects the United Kingdom and France and because of its high freight traffic. However, it has been discarded, because the British side of the cross-border section does not have any ETCS activity, and the United Kingdom is not in the scope of this study as it is not an EU MS anymore. In addition, the level of traffic could be reduced after the United Kingdom leaves the European Union.

***Border ES/FR (Portbou) – Perpignan***

In the Mediterranean Corridor there two lines planned in the EDP between Spain and France: one is the high-speed line and the other one is the conventional line. Nowadays, the high-speed line is already in operation and supports mixed traffic, i.e. passenger and freight traffic on the same line.

The conventional line should have been selected as a priority gap according to the criteria explained in Section 4. However, it was finally discarded because, as previously mentioned, there is an existing mixed-traffic line in operation connecting the two countries.

### *5.10 **Germany***

Germany has a mix of ETCS deployment categories. On the one hand, the ETCS deployments on the NSB, OEM, RDN and SCM Corridors have the ETCS island category because they focused on specific areas as shown in the sketch in section 5.5.1. On the other hand, the ETCS deployments of the ATL and RALP Corridors assume that the majority of the lines will be under construction in the short term (i.e. ETCS network with gaps).

According to the EDP, this MS should equip with ETCS 8,138 km of lines belonging to the CNC by 2030. Of this length, 6,373 km are not expected to be under construction or in operation in the short term. The result is the prioritisation of 844 km. The reasons why these gaps were selected as a priority sections are explained below.

The following table shows all the identified gaps in Germany, i.e. lines that are not in operation, under construction or funded with a CEF project in the CNC. According to

the criteria and methodology explained in Section 4, gaps are listed from the highest to the lowest priority gaps. Lines highlighted in blue are the gaps to be prioritised in Germany.

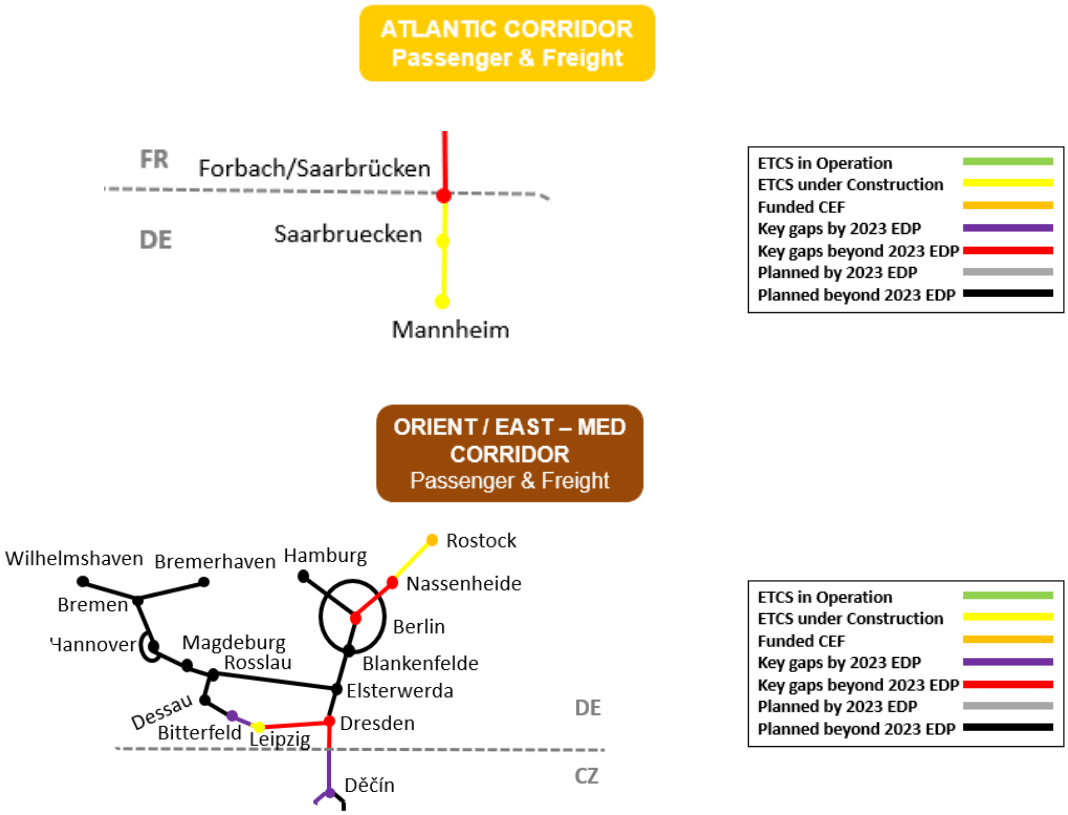
| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/ year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| German border (NL/DE) - Duisburg | 85 | RALP | DE | Passenger and freight | 60.5 | 31/12/2030 | X | Medium (27589) | Medium (35932) | The total length of the section is 77 km, 11 km are with ETCS into operation, 5 km are with ETCS under construction and 59 km are funded by the CEF project 2014-DE-TM-0252-M, but the aim of this project is prepare a study of the installation of ETCS between the D/NL border at Emmerich and Oberhausen. |
| Köln node - Aachen | 83 | NSB - RALP | DE | Passenger and freight | 82.2 | 31/12/2023 | X | Medium (16092) | Medium (36646) | |
| Border FR/DE (Strasbourg/Kehl) - Appenweier | 78 | RDN | DE | Passenger and freight | 13.9 | 31/12/2030 | X | Low(7294) | Low(18579) | The total length of this section is 101 km, on the rest of the line ETCS is under construction |
| Nürnberg - Ingolstadt - München node - Border DE/AT (Kufstein) | 77 | SCM | DE | Passenger and freight | 261.7 | 31/12/2030 | X | Medium (18160) | Medium (33267) | In the München node only the section which belong to the SCM corridor |
| Bitterfeld - Leipzig | 75 | OEM - SCM | DE | Passenger and freight | 14.1 | 31/12/2023 | | Medium (27379) | Medium (46462) | The total length of this section is 29 km, the rest of the line has ETCS under construction |
| Erkner - Berlin | 71 | NSB | DE | Passenger and freight | 14.8 | 31/12/2030 | | Medium (18903) | Low(25998) | This section belongs to Rail Baltica |
| Karlsruhe - Sttutgart | 70 | RDN | DE | Freight | 118.6 | 31/12/2030 | | Medium (20176) | Medium (36753) | |
| Berlin - Bitterfeld | 70 | SCM | DE | Passenger and freight | 19.2 | 31/12/2023 | | Low(7636) | Medium (33098) | The station of Wittenberg and the section between Berlin and Birkengrund |
| Berlin Node | 69 | NSB - OEM - SCM | DE | Passenger and freight | 43.3 | 31/12/2030 | | Medium (20629) | Low(30363) | |
| Leipzig - Border DE/CZ (Bundesgrenze) | 69 | OEM | DE | Passenger and freight | 174.4 | 31/12/2030 | X | Medium (22598) | Medium (37129) | |

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/ year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Nassenheide - Berlin | 66 | OEM - SCM | DE | Passenger | 16.3 | 31/12/2030 | | Low(6360) | Low(29414) | The total length of this section is 59 km, the rest of the line has ETCS under construction. |
| Frankfurt-Gross Gerau | 65 | RALP | DE | Passenger | 24.9 | 31/12/2030 | | Medium (19006) | High(73044) | |
| Ulm - München - Border DE/AT (Freilassing/Salzburg) | 65 | RDN | DE | Passenger and freight | 278.7 | 31/12/2030 | | Medium (13005) | Medium (45411) | |
| Regensburg - Passau | 62 | RDN | DE | Passenger and freight | 110.6 | 31/12/2030 | | Medium (35976) | Medium (31959) | |
| Hannover - Köln | 61 | NSB | DE | Passenger and freight | 192.1 | 31/12/2030 | | Medium (19784) | Medium (58785) | |
| München - Regensburg | 59 | SCM - RDN | DE | Passenger and freight | 61.0 | 31/12/2030 | | Medium (11934) | Medium (36466) | |
| Mannheim - Gross Gerau | 58 | RALP-RDN | DE | Passenger | 51.7 | 31/12/2030 | | Medium (19006) | High(73044) | |
| Leipzig - München | 58 | SCM - RDN | DE | Passenger and freight | 383.9 | 31/12/2030 | | Low(6367) | Low(30343) | |
| Würzburg - Nürnberg | 58 | SCM - RDN | DE | Passenger and freight | 120.5 | 31/12/2030 | | Medium (34884) | Medium (56191) | |
| Osnabrück - Border DE/NL (German border II) | 57 | NSB | DE | Passenger and freight | 77.3 | 31/12/2030 | X | Medium (21609) | Low(27517) | |
| Darmstadt - Frankfurt am Main | 57 | RALP - RDN | DE | Freight | 26.9 | 31/12/2030 | | Low(18) | Medium (40107) | |
| Regensburg - Border DE/CZ (Furth im Wald/Ceska Kubice) | 57 | RDN | DE | Passenger and freight | 112.9 | 31/12/2030 | X | Low(3066) | Low(18946) | |
| Treuchtlingen - München | 57 | SCM - RDN | DE | Passenger and freight | 91.6 | 31/12/2030 | | Medium (28994) | Medium (59327) | |
| Mannheim - Hockenheim | 56 | RALP - RDN | DE | Passenger | 22.7 | 31/12/2030 | | High(55251) | Low(22699) | |
| Hannover - Osnabrück | 56 | NSB | DE | Passenger and freight | 110.9 | 31/12/2030 | | Medium (32232) | Medium (44682) | |
| Hildesheim - Göttingen | 56 | SCM | DE | Freight | 166.0 | 31/12/2030 | | High(49100) | Medium (36926) | |
| Bremen - Nienburg - Hannover | 55 | NSB - OEM - SCM | DE | Freight | 131.3 | 31/12/2030 | | Medium (43184) | Medium (42404) | |
| Nürnberg - Schirding | 55 | RDN | DE | Passenger and freight | 139.2 | 31/12/2030 | | Low(3086) | Medium (32266) | |

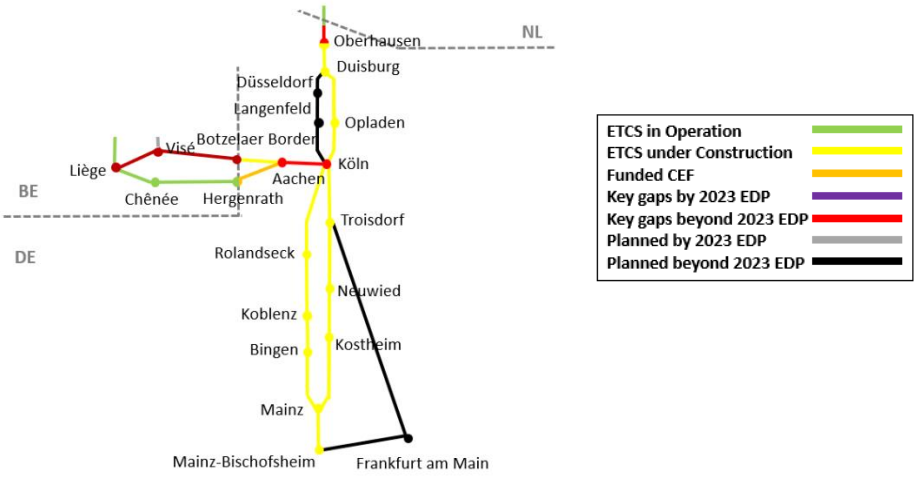
| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/ year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Bremen - Bremerhaven | 55 | NSB - OEM | DE | Passenger and freight | 65.5 | 31/12/2030 | | Medium (38110) | Medium (34799) | |
| Troisdorf - Frankfurt | 54 | RALP | DE | Passenger | 152.2 | 31/12/2030 | | Low(2736) | Medium (33825) | |
| Göttingen - Fulda | 54 | SCM | DE | Passenger and freight | 132.7 | 31/12/2030 | | High(48102) | Low(25974) | This section is inside the route Würzburg - Göttingen |
| Hannover - Magdeburg | 54 | NSB - OEM | DE | Passenger | 148.9 | 31/12/2030 | | Medium (39501) | Medium (39578) | |
| Border DK/DE (Puttgarden) - Lübeck | 53 | SCM | DE | Passenger and freight | 101.8 | 31/12/2028 | X | Low(2370) | Medium (32090) | |
| Nürnberg - Regensburg | 53 | RDN | DE | Passenger and freight | 103.4 | 31/12/2030 | | Medium (44454) | Medium (40031) | |
| Flensburg Weiche - Hamburg | 53 | SCM | DE | Passenger and freight | 224.9 | 31/12/2030 | | Medium (15908) | Medium (44039) | |
| Nürnberg - Treuchtlingen | 53 | SCM | DE | Freight | 59.8 | 31/12/2030 | | Medium (12075) | Medium (33099) | |
| Berlin - Werder (Havel) - Magdeburg | 52 | NSB | DE | Passenger | 128.1 | 31/12/2030 | | Medium (39501) | Medium (39578) | |
| Hamburg - Lauenbruck | 52 | SCM | DE | Passenger and freight | 45.6 | 31/12/2030 | | Medium (30732) | Low(27007) | |
| Mannheim - Heidelberg - Karlsruhe | 52 | RALP - RDN | DE | Freight | 68.8 | 31/12/2030 | | Medium (9537) | High(75167) | |
| Rosslau - Dessau - Bitterfeld | 52 | OEM | DE | Passenger and freight | 30.4 | 31/12/2030 | | Medium (25407) | Medium (34655) | |
| Waghäusel - Bruchsal - Stuttgart | 51 | RDN | DE | Passenger | 73.2 | 31/12/2030 | | Low(4731) | Medium (46613) | This section is inside the route Stuttgart - Appenweier |
| Stuttgart - Ulm (High-Speed) | 50 | RDN | DE | Passenger | 75.6 | 31/12/2022 | | Medium (22785) | Medium (56798) | |
| Frankfurt am Main - Würzburg | 50 | RDN | DE | Passenger and freight | 122.1 | 31/12/2030 | | Medium (15681) | Medium (34271) | |
| Hamburg - Uelzen - Hannover (Hildesheim) | 50 | SCM | DE | Freight | 153.1 | 31/12/2030 | | Medium (33690) | Medium (53067) | |
| Köln - Düsseldorf - Duisburg | 49 | RALP | DE | Freight | 44.9 | 31/12/2023 | | Medium (20224) | High(81726) | The total length of this section is 59 km, and the rest of the line has ETCS under construction |
| Magdeburg - Rosslau | 48 | NSB - OEM | DE | Passenger and freight | 55.8 | 31/12/2030 | | Medium (20455) | Low(13435) | |

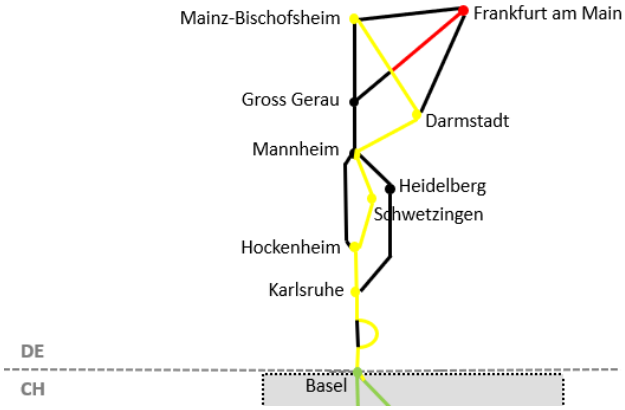
| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/ year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Bremen - Wilhelmshaven | 47 | NSB - OEM | DE | Passenger and freight | 96.7 | 31/12/2030 | | Medium (13185) | Medium (43428) | |
| Mainz-Bischofsheim - Frankfurt | 47 | RALP | DE | Passenger and freight | 22.4 | 31/12/2030 | | No Traffic Data | No Traffic Data | |
| Berlin - Brieselang - Hamburg | 47 | NSB - OEM | DE | Passenger and freight | 257.7 | 31/12/2030 | | Medium (14974) | Medium (35863) | |
| Lübeck - Hamburg | 46 | SCM | DE | Passenger and freight | 47.4 | 31/12/2030 | | Low(6333) | Medium (47543) | |
| Lauenbruck - Bremen | 45 | SCM | DE | Passenger and freight | 56.4 | 31/12/2030 | | Medium (30732) | Low(27007) | |
| Hamburg - Berlin | 45 | OEM | DE | Passenger | 25.1 | 31/12/2030 | | Medium (10718) | Low(28952) | |
| Rosslau - Elsterwerda | 45 | OEM | DE | Freight | 108.8 | 31/12/2030 | | Medium (15353) | Low(13314) | |
| Würzburg - Treuchtlingen | 44 | SCM | DE | Freight | 138.0 | 31/12/2030 | | Medium (35237) | Low(19019) | |
| Berlin Blankenfelde - Elsterwerda - Dresden | 43 | OEM | DE | Passenger and freight | 158.5 | 31/12/2030 | | Medium (9565) | Low(19299) | |
| Hannover - Hildesheim | 42 | SCM | DE | Passenger | 54.2 | 31/12/2030 | | Medium (23723) | Medium (37548) | |
| Berlin (ring network) | 42 | NSB - OEM - SCM | DE | Freight | 126.5 | 31/12/2030 | | No Traffic Data | No Traffic Data | |
| Berlin - Wolfsburg - Hannover | 40 | NSB | DE | Passenger | 224.7 | 31/12/2030 | | No Traffic Data | No Traffic Data | |
| Lauenbruck - Visselhoevede - Hannover | 37 | SCM | DE | Passenger | 103.2 | 31/12/2030 | | Low(1044) | High(71511) | |
| Göttingen - Kassel - Würzburg | 34 | SCM | DE | Passenger | 199.8 | 31/12/2030 | | Medium (10481) | Low(26992) | |
| Kenzingen - Mulheim | 31 | RALP | DE | Freight | 45.1 | 31/12/2030 | | No Traffic Data | No Traffic Data | |
| **Total Length not expected in the short (km)** | | | | | **6372.5** | | | | | |
| **Total gaps priority (km)** | | | | | **843.9** | | | | | |

### *5.10.1* ***Sketch with the priority gaps***

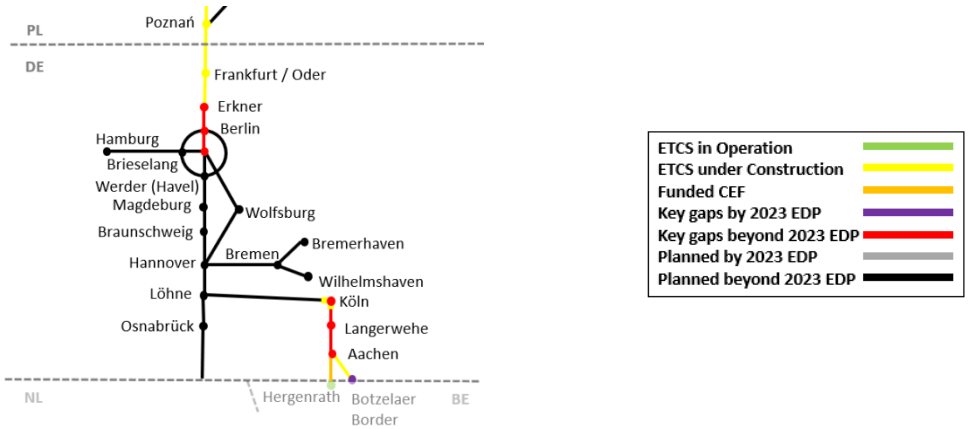


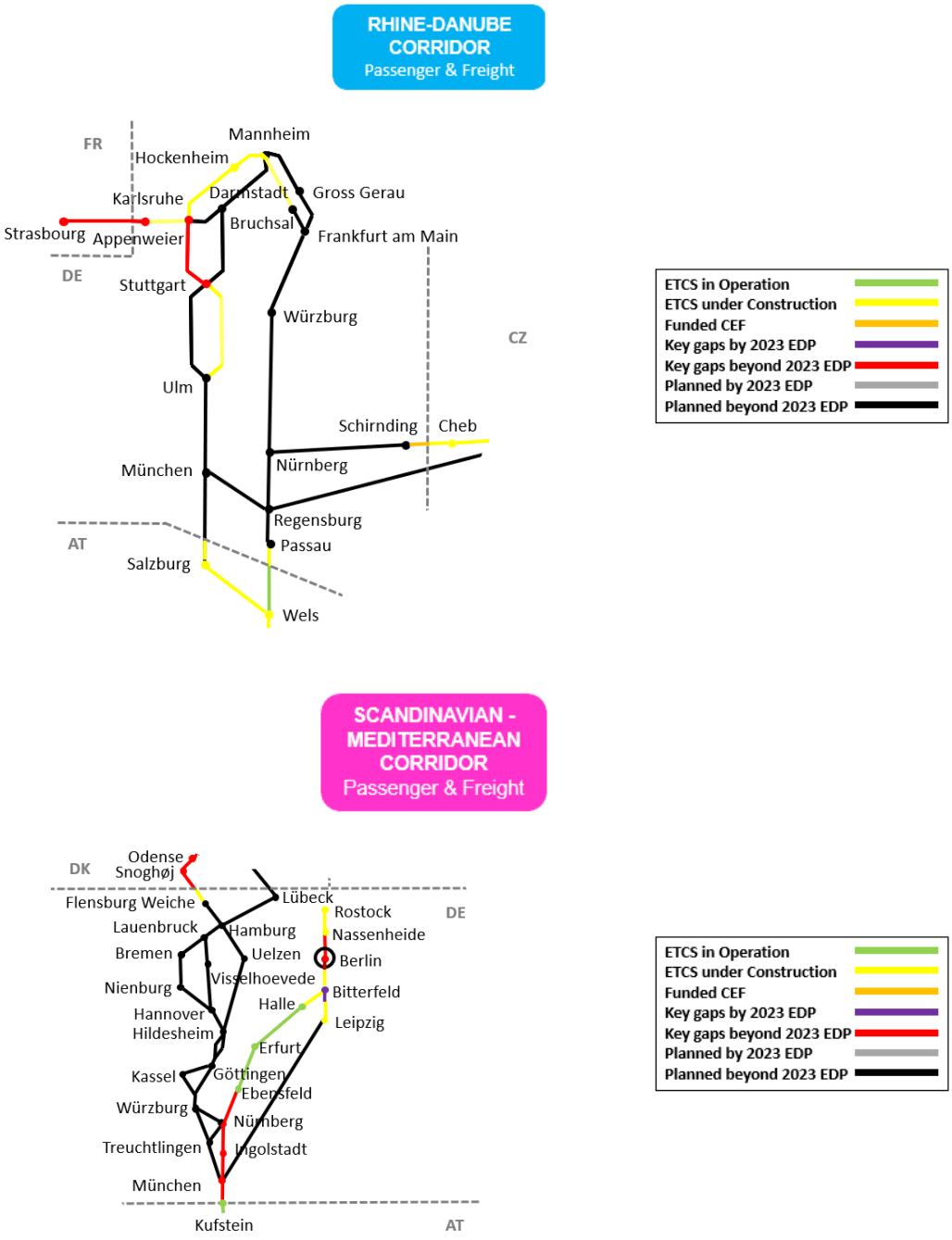
**RHINE – ALPINE CORRIDOR**
Passenger & Freight




**NORTH-SEA BALTIC CORRIDOR**
Passenger & Freight






### *5.10.2* ***Priority gaps***

#### *German border (NL/DE) - Duisburg*

The line German border (NL/DE) - Duisburg belongs to the RALP Corridor. The total length is 77 km, of which 11 km are already with ETCS in operation, 5 km are with ETCS under construction and 59 km are funded by the CEF project 2014-DE-TM-0252-M. However, the aim of this project is to prepare preliminary studies for the ERTMS deployment, so there is no construction civil work leading to an ETCS implementation. Therefore, it is not expected that this section will be in operation with ETCS in the short term, so this section remains a gap in the network.

This line should be selected as a priority gap because it connects Germany and Netherlands. Furthermore, the Dutch side of the cross-border section already has ETCS in operation.

***Köln node - Aachen***

The Köln node – Aachen line belongs to the NSB and RALP Corridor. The total length of the line is 101 km, of which 19km already has ETCS under construction. The rest of the line should be selected as a priority gap because it connects the Belgium border with the Köln – Oberhausen and Köln - Mainz-Bischofsheim lines which already have ETCS under construction.

***Border FR/DE (Strasbourg/Kehl) - Appenweier***

The Border FR/DE (Strasbourg/Kehl) – Appenweier line belongs to the RDN Corridor. This line connects Germany and France. Furthermore, the French side of the cross-border section has also been selected as a priority gap.

***Nürnberg - Ingolstadt - München node - Border DE/AT (Kufstein)***

The Nürnberg - Ingolstadt - München node - Border DE/AT (Kufstein) line belongs to the SCM. This line should be selected as a priority gap because it connects the capital city of the country, Berlin, with the Austrian side of the cross-border section. Furthermore, the Austrian side of the cross-border section already has ETCS in operation.

***Bitterfeld – Leipzig***

The Bitterfeld – Leipzig line belongs to the OEM and SCM Corridor. The total length of this line is 29 km, from which 15 km are being fitted with ETCS. The section without ETCS related activities is that between Bitterfield station and the section connecting Delitzsch and Bitterfeld. This line should be selected as a priority gap because connects Bitterfeld – Leipzig and Bitterfiels – Berlin, both lines already with ETCS under construction.

***Erkner – Berlin***

The Erkner – Berlin line belongs to the NSB Corridor and Rail Baltica. This section should be selected as a priority gap because it connects the capital city of the country, Berlin, and the Polish cross-border section, because the Erkner – Border (DE/PL) line is already under construction with ETCS. In addition, this section allows a direct connection between Berlin and the Polish capital city, Warszawa, where the Warszawa – Border (PL/DE) line also has ETCS under construction.

***Karlsruhe – Stuttgart***

The Karlsruhe – Stuttgart line belongs to the RDN Corridor. This section should be selected as a priority gap because it connects the Karlsruhe – Mannheim and Stuttgart- Ulm lines, both of which already have ETCS under construction.

***Berlin – Bitterfeld***

The Berlin – Bitterfeld line belongs to the SCM Corridor. The total length of the line is 126 km, of which 108.6 km are already being fitted with ETCS. The sections which have no ETCS activity are the Wittenberg station and the section connecting this line with the Berlin node. This line should be selected as a priority gap because it connects

the Berlin node and the Ebensfeld – Bitterfeld line which has a section with ETCS in operation and a section with ETCS under construction.

***Berlin Node***

The Berlin node belongs to the NSB, OEM and SCM Corridors. This line should be selected as a priority gap because it connects the lines: Berlin – Erkner, Berlin – Bitterfield and Berlin – Nassenheide, where all these lines already have ETCS under construction.

***Leipzig – Dresden - DE/CZ (Bundesgrenze) border***

The Leipzig - Dresden - DE/CZ (Bundesgrenze) border line belongs to the OEM Corridor. This section should be selected as a priority gap because it connects Germany and Netherlands. Furthermore, the Czech side of the cross-border section is also selected as a priority gap.

***Nassenheide – Berlin***

The Nassenheide – Berlin line belongs to the OEM and SCM Corridors. This section connects the Berlin node with one of the most important port of the Baltic Sea, Rostock, for this reason this section should be selected as a priority gap.

***Frankfurt- Gross Gerau***

The Frankfurt- Gross Gerau line belongs to the RALP Corridor. This section should be selected as a priority gap because it allows a connection between the Frankfurt node and the Rhine – Alphine line, which already has ETCS under construction. Also, this section is the busiest for both types of traffic compared to the rest of the section connecting this node with the RALP. Therefore, with this gap, the Frankfurt node will be connected to the Netherlands, Belgium and Switzerland in the medium term.

## *5.11* ***Greece***

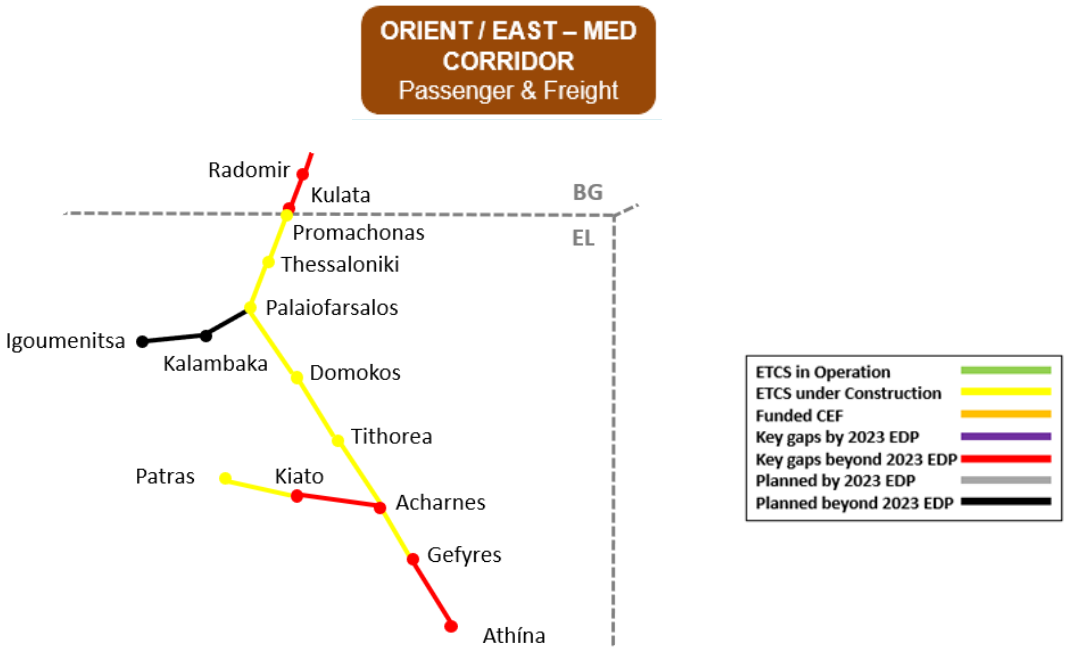
Greece has an ETCS deployment category of ETCS network with gaps. This means that a limited number of lines of the country belonging to the CNC are not expected to have ETCS under construction or in operation in the short term. In this country, 1,057 km of lines should be equipped with ETCS by 2030 according to the EDP [3]. Only 336 km are not expected to be under construction or in operation in the short term, i.e. 30% of the total length of the CNC in Greece.

The result is the prioritisation of 121 km. The reasons why these gaps were selected as a priority sections are explained below.

The following table shows all the identified gaps in Greece, i.e. lines that are not in operation, under construction or funded with a CEF project in the CNC. According to the criteria and methodology explained in Section 4, gaps are listed from the highest to the lowest priority gaps. Lines highlighted in blue are the gaps to be prioritised in Greece.

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Acharnes - Kiato | 75 | OEM | EL | Passenger and freight | 112.4 | 31/12/2025 | | High (193) | High (8007) | |
| Gefyres - Pireaus | 64 | OEM | EL | Passenger and freight | 8.8 | 31/12/2030 | | High (166) | Low (248) | This section is inside the route Gefyres - Athína |
| Plaiofarsalos - Kalambaka - Igoumenitsa | 31 | OEM | EL | Passenger and freight | 215.0 | 31/12/2030 | | Low (15) | Medium (3238) | |
| **Total Length not expected in the short (km)** | | | | | **336.2** | | | | | |
| **Total gaps priority (km)** | | | | | **121.2** | | | | | |

### *5.11.1* ***Sketch with the priority gaps***




### *5.11.2* ***Priority gaps***

***Acharnes - Kiato***

The Acharnes - Kiato line belongs to the OEM Corridor. This line allows connection of the cities of Patras and Kiato with the rest of Europe. In addition, it is the busiest gap for both passenger and freight traffic. For these reasons it is selected as a priority gap.

***Gefyres - Pireaus***

The Gefyres - Pireaus line belongs to the OEM Corridor. This line should be selected as a priority gap because of its short length (9 km) and because it connects a major maritime port while closing the gap between Athens, the capital city of Greece, Bulgaria and the rest of Europe

### *5.12* ***Hungary***

Hungary has an ETCS deployment category of ETCS network with gaps. This means that a limited number of lines in the CNC in the MS are not expected to have ETCS under construction or in operation in the short term.

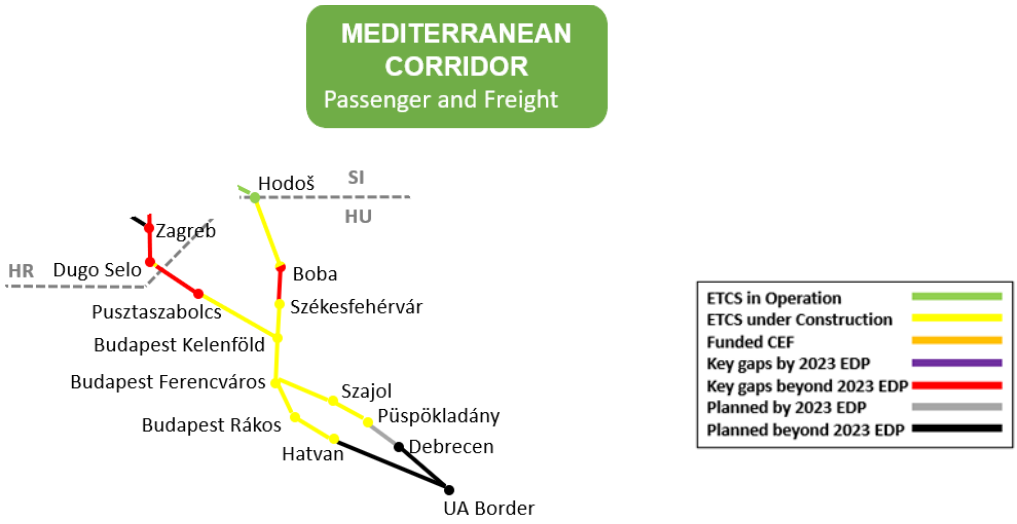
According to the EDP, this MS should equip with ETCS 1,443 km of lines belonging to the CNC by 2030. Of this length, 788 km are not expected to have ETCS under construction or in operation in the short term. The result is the prioritisation of 358 km. The reasons why these gaps were selected as a priority sections are explained below.

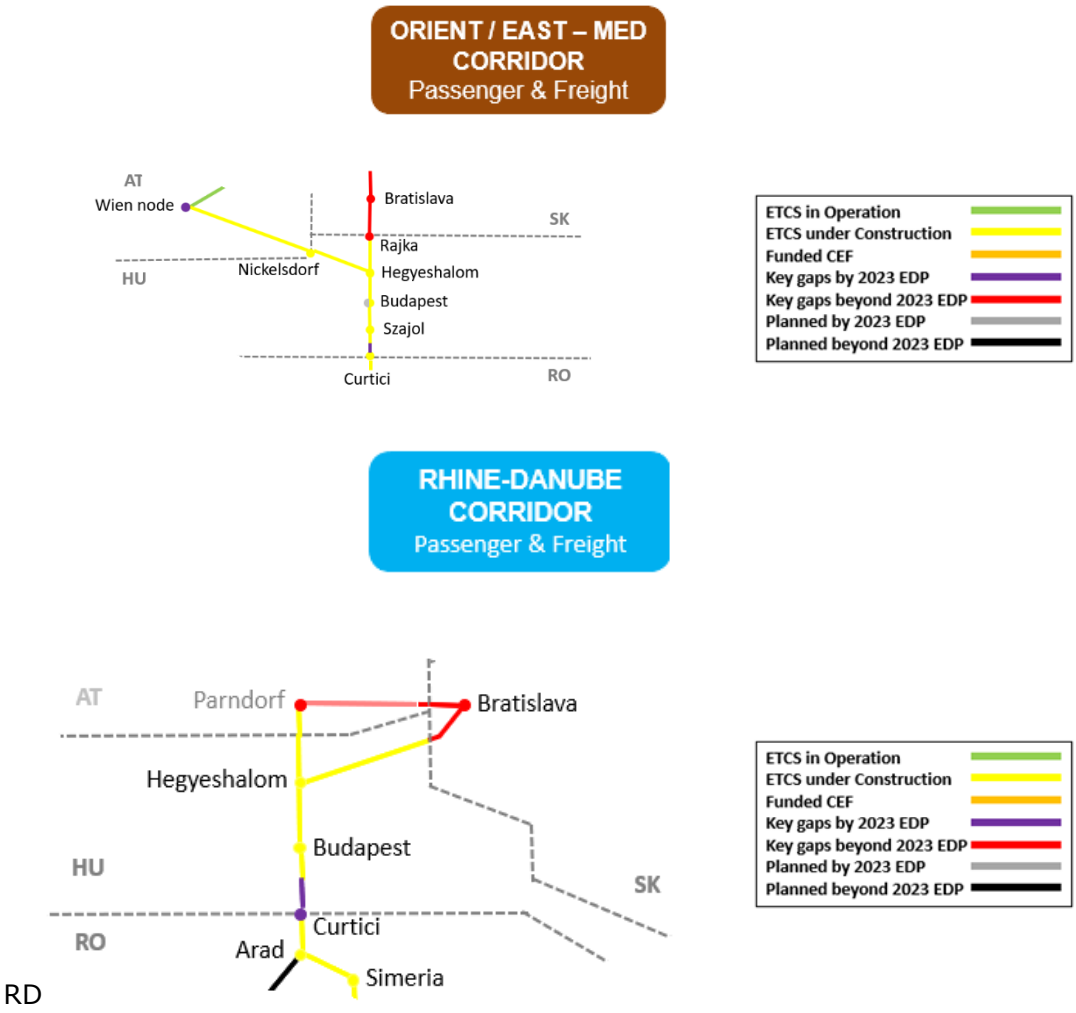
The following table shows all the identified gaps in Hungary, i.e. lines that are not in operation, under construction or funded with a CEF project in the CNC. According to the criteria and methodology explained in section 4, gaps are listed from the highest to the lowest priority gaps. Lines highlighted in blue are the gaps to be prioritised in Hungary.

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Border HR/HU (Botovo) - Pusztaszabolcs | 72 | MED | HU | Passenger and freight | 212.0 | 31/12/2021 | X | Medium (4338) | Low (25730) | |
| Szajol - Border RO/HU | 68 | OEM - RDN | HU | Passenger and freight | 32.9 | 31/12/2021 | X | High (9787) | Low (22108) | The total length of the section is 117 km and the rest of the line is already with ETCS under construction. This section is located inside the route Budapest-Cutici in the RDN corridor. |
| Boba - Székesfehérvár | 62 | MED | HU | Passenger and freight | 112.6 | 31/12/2030 | | Medium (4868) | Low (20790) | |
| Szajol - Püspökladány - Debrecen - Border HU/UA (Zahony) | 55 | MED | HU | Passenger | 226.6 | 31/12/2030 | X | Medium (6393) | Low (24342) | |
| Budapest node (part 2) | 53 | OEM | HU | Passenger and freight | 3.6 | 31/12/2021 | | Low (26) | High (34714) | The section is located in the Budapest node and connects Budapest Ferencvaros with Budapest Keleti, but this section is not needed to a |

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | continuous operation in the Budapest node |
| Hatvan - Border HU/UA (Zahony) | 45 | MED | HU | Freight | 200.6 | 31/12/2030 | | Medium (6697) | Low (22511) | |
| **Total Length not expected in the short (km)** | | | | | **788.3** | | | | | |
| **Total gaps priority (km)** | | | | | **357.5** | | | | | |

### *5.12.1* ***Sketch with the priority gaps***






### *5.12.2* ***Priority gaps***

#### ***Border HR/HU (Botovo) – Pusztaszabolcs***

The border HR/HU (Botovo) – Pusztaszabolcs line belongs to the MED Corridor. This section is a priority gap because it connects Hungary and Croatia. In addition, the Croatian section is already being fitted with ETCS.

#### ***Szajol - Border RO/HU***

The Szajol - Border RO/HU line belongs to the OEM and RDN Corridors. The section of this line may be a priority gap because a section of this line (84 km) is already under construction. In addition, this section connects Hungary and Romania.

#### ***Boba - Székesfehérvár***

The Boba - Székesfehérvár line belongs to the MED Corridor. This line should be selected as a priority gap because it connects the capital city of the MS, Budapest, with the Slovenian side of the cross-border section. Furthermore, the Slovenian border is already with ETCS in operation.

### 5.13 *Ireland*

Ireland is not connected to mainland Europe by railway but it has railway lines that belong to the NSM Corridor.

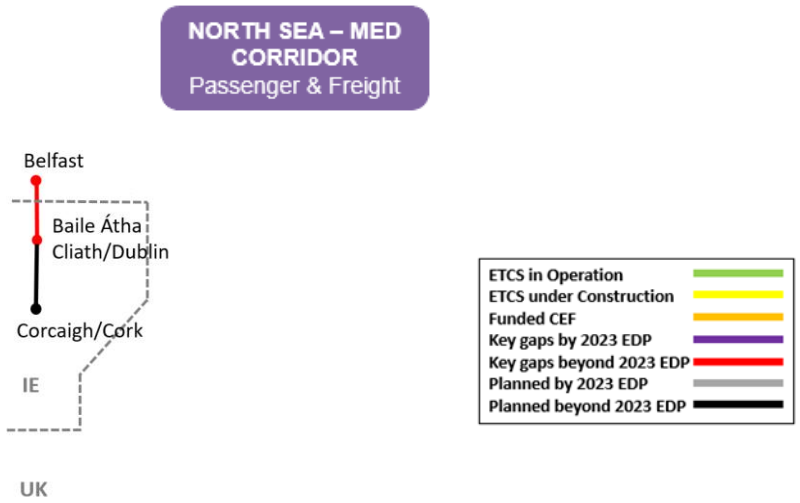
Ireland does not have any line with ETCS in operation, under construction or funded. The reason for this could be the fact that Ireland is not obligated to equip any line with ETCS by 2030.

This MS has 369 km belonging to the CNC. However, Ireland is exempt from having to equip with ETCS the CNC. The result is the prioritisation of 95 km. The reasons why these gaps were selected as a priority sections will be explained below

The following table shows all the identified gaps in Ireland, i.e. lines that are not in operation, under construction or funded with a CEF project in the CNC. According to the criteria and methodology explained in Section 4, gaps are listed from the highest to the lowest priority gaps. Lines highlighted in blue are the gaps to be prioritised in Ireland.

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Border UK/IE (Drogheda) - Baile Átha Cliath/Dublin | 57 | NSM | IE | Passenger and freight | 95.4 | Beyond 2030 | X | Low (0) | High (22256) | |
| Baile Átha Cliath/Dublin - Corcaigh/Cork | 25 | NSM | IE | Passenger and freight | 273.9 | Beyond 2030 | | Low (0) | Low (9412) | |
| **Total Length not expected in the short (km)** | | | | | **369.3** | | | | | |
| **Total gaps priority (km)** | | | | | **95.4** | | | | | |

#### 5.13.1 *Sketch with the priority gaps*



### *5.13.2* ***Priority gaps***

***Border UK/IE (Drogheda) - Baile Átha Cliath/Dublin***

The border UK/IE (Drogheda) - Baile Átha Cliath/Dublin line belongs to the NSM corridor. If a line is prioritised in Ireland, this line should be selected as a priority gap because it connects the United Kingdom and Ireland. In addition, this line is the busiest gap in Ireland for passenger and freight traffic.

## *5.14* ***Italy***

Italy is included in two different categories according the ETCS deployment: ETCS islands in the case of BAC, MED and SCM Corridors and ETCS network with gaps for the RALP Corridor.

Around 5,060 km belonging to the CNC should be equipped with operating ETCS by 2030. There are currently 3,655 km of lines without any type of ETCS activity, i.e. without ETCS in operation, ETCS under construction or without CEF project assigned. Of these 3,655 km, 469 km have been selected as priority gaps.

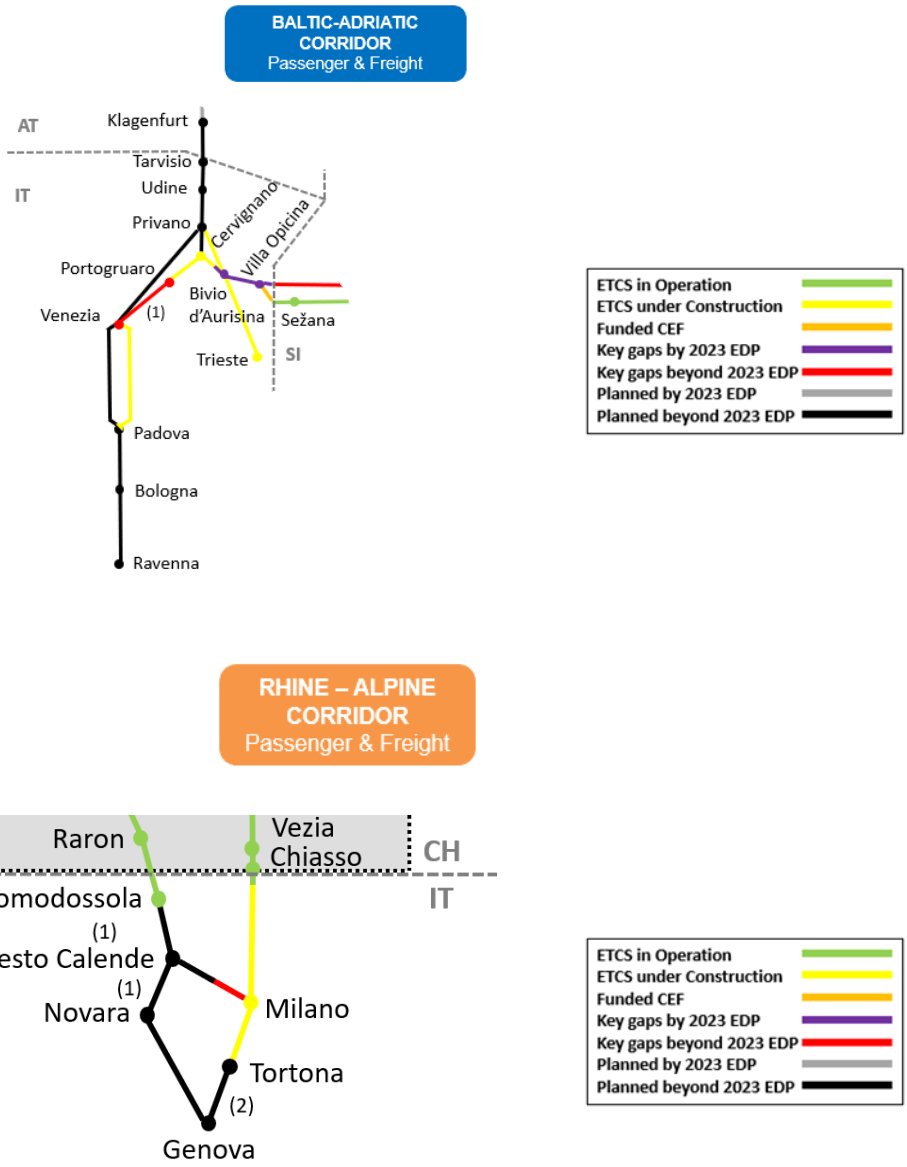
The following table shows all the identified gaps in Italy, i.e. lines that are not in operation, under construction or funded with a CEF project in the CNC. According to the criteria and methodology explained in Section 5, gaps are listed from the highest to the lowest priority. Lines highlighted in blue are the gaps to be prioritised in Italy.

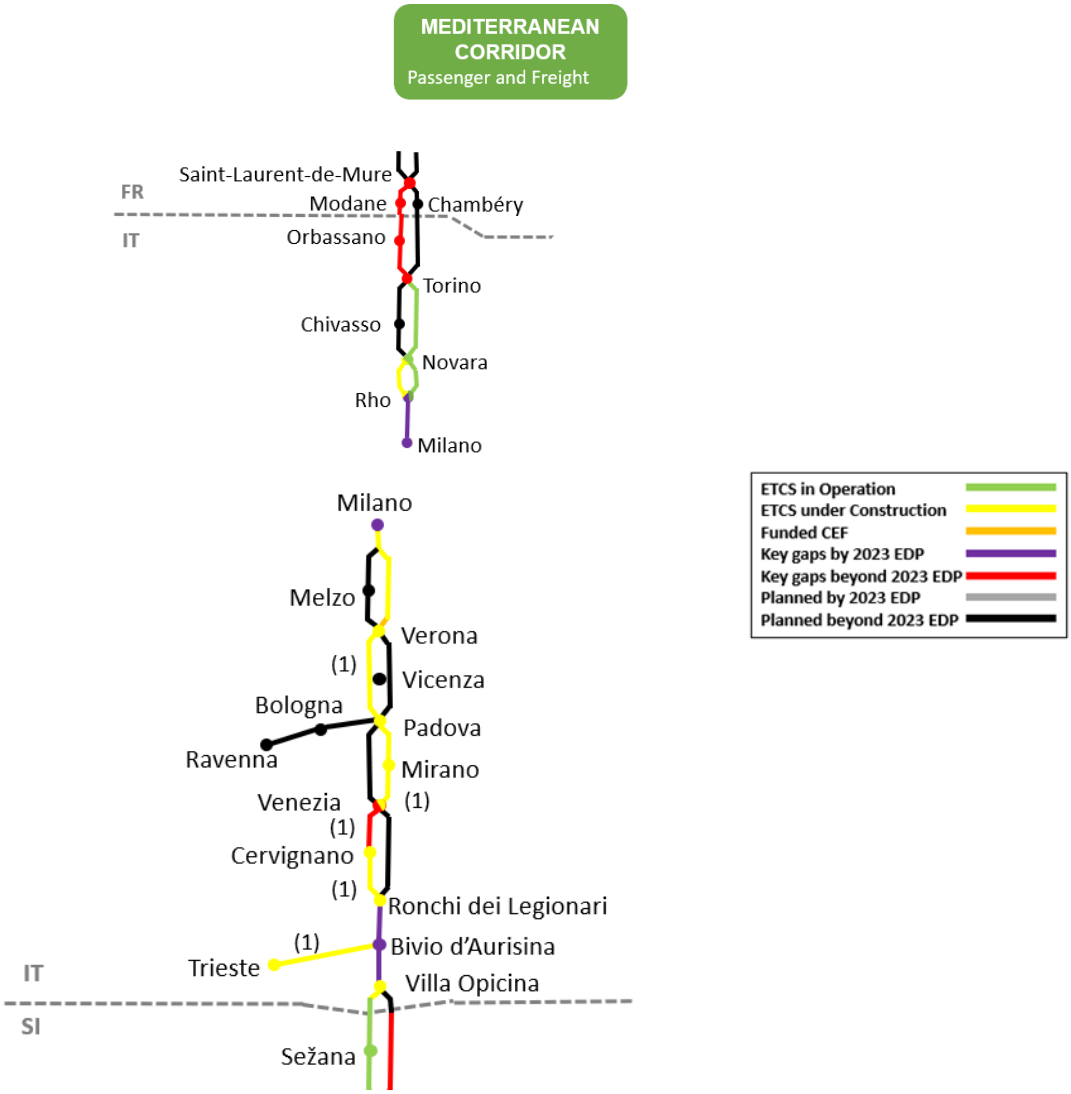
| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Ronchi dei Legionari Sud - Villa Opicina - Border IT/SI (Sežana) | 76 | BAC - MED | IT | Passenger and freight | 29.2 | 30/12/2022 | X | Medium (10745) | Low (21019) | |
| Settebagni - Roma | 71 | SCM | IT | Passenger and freight | 26.9 | 31/12/2020 | | Low (1831) | High (72188) | |
| Border AT/IT (Brennero base tunnel) - Fortezza | 70 | SCM | IT | Passenger and freight | 24.0 | 31/12/2026 | X | High (20757) | Low (22251) | This section is the high-speed line, although this section is shown with traffic flow, this traffic belongs to the conventional line, because the infrastructure of this line is being built according to reference [4] In the TENTec Viewer, the conventional line is shown as not belonging to the CNC. Although, in |

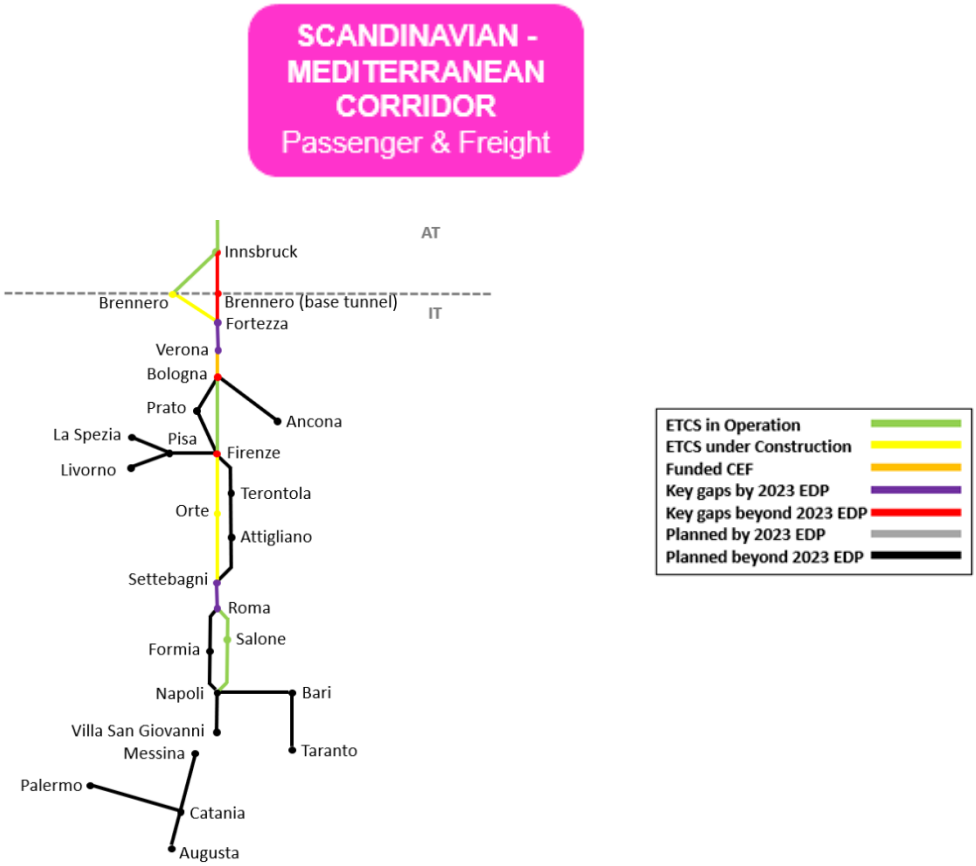
| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | the EDP, it is shown as belonging to the SCM corridor |
| Bologna node | 67 | SCM | IT | Passenger and freight | 7.6 | 31/12/2026 | | Low (42) | Medium (50669) | |
| Fortezza - Verona | 66 | SCM | IT | Passenger and freight | 181.4 | 31/12/2022 | X | No Traffic Data | No Traffic Data | |
| Verona node | 66 | SCM | IT | Passenger and freight | 3.3 | 31/12/2026 | | Low (314) | Low (33237) | |
| Firenze Castello - Firenze Campo di Marte | 65 | SCM | IT | Passenger and freight | 14.4 | 31/12/2022 | | No Traffic Data | No Traffic Data | It is the Firenze node |
| Border FR/IT (Modane) - Torino | 64 | MED | IT | Freight | 91.1 | 31/12/2030 | X | Medium (8267) | Low (19785) | The conventional line |
| Border AT/IT (Thoerl-Maglern) - Udine - Privano - Cervignano | 63 | BAC | IT | Passenger and freight | 122.0 | 31/12/2030 | X | Medium (12096) | Low (8195) | |
| Rho - Milano | 62 | MED - RALP | IT | Passenger and freight | 28.8 | 31/12/2022 | | Medium (4174) | Medium (48103) | Rho is located between Sesto Calende and Milano and the name of the node does not appear on the RALP corridor |
| Venezia node | 61 | BAC-MED | IT | Passenger and freight | 8.6 | 31/12/2030 | | Low (1) | High (92232) | |
| Portogruaro - Venezia | 61 | BAC - MED | IT | Freight | 58.5 | 31/12/2030 | | Medium (4201) | Low (31562) | In the MED corridor this section is Cervignan - Venezia |
| Bologna - Ancona | 60 | SCM | IT | Passenger and freight | 201.9 | 31/12/2026 | | Medium (11265) | Medium (39740) | |
| Pisa - La Spezia | 60 | SCM | IT | Passenger and freight | 59.6 | 31/12/2026 | | Medium (5753) | Medium (37212) | |
| Padova - Bologna | 60 | BAC - MED | IT | Passenger and freight | 120.3 | 31/12/2026 | | Medium (7753) | Medium (38738) | |
| Cuzzago - Sesto Calende | 59 | RALP | IT | Passenger and freight | 43.6 | 31/12/2026 | | Medium (16143) | Low (18812) | |
| Border FR /IT (Modane) - Orbassano - Torino node | 58 | MED | IT | Passenger and freight | 86.7 | 31/12/2030 | X | Low (363) | Low (18420) | The high-speed line and the Tornio Node |
| Firenze - Pisa - Livorno | 57 | SCM | IT | Freight | 93.0 | 31/12/2026 | | Medium (4155) | Medium (34794) | |

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Venezia - Padova | 53 | BAC - MED | IT | Freight | 29.5 | 31/12/2030 | | Medium (5309) | Low(29788) | |
| Novara - Genova | 50 | RALP | IT | Freight | 142.4 | 31/12/2026 | | Low (1690) | Low (9189) | |
| Tortona - Genova | 49 | RALP | IT | Passenger and freight | 59.4 | 31/12/2021 | | Medium (4613) | Low (14507) | |
| Verona - Vicenza - Padova (HS) | 49 | MED | IT | Freight | 83.5 | 31/12/2030 | | Medium (12545) | Medium (39454) | |
| Napoli - Bari | 48 | SCM | IT | Passenger and freight | 313.7 | 31/12/2030 | | Medium (3233) | Low (19636) | |
| Bologna - Prato - Firenze | 47 | SCM | IT | Freight | 84.4 | 31/12/2026 | | Medium (12527) | Low (20946) | |
| Novara - Sesto Calende - Rho | 46 | RALP | IT | Passenger and freight | 69.3 | 31/12/2026 | | Medium (9792) | Low (31739) | |
| Napoli - Villa San Giovanni | 44 | SCM | IT | Passenger and freight | 430.0 | 31/12/2026 | | Low (1844) | Low (21107) | |
| Bari - Taranto | 43 | SCM | IT | Passenger and freight | 106.8 | 31/12/2030 | | Low (773) | Low (11243) | |
| Castel Bolognese/Faenza - Ravenna | 43 | BAC | IT | Freight | 55.0 | 31/12/2030 | | Low (2909) | Low (10030) | Castel Bolognese belongs to Bologna – Ravenna line |
| Torino - Chivasso - Novara | 42 | MED | IT | Freight | 85.9 | 31/12/2026 | | Medium (4165) | Medium (39468) | |
| Milano - Melzo - Verona | 41 | MED | IT | Passenger | 20.7 | 31/12/2030 | | Low (529) | Medium (44670) | |
| Roma - Formia - Napoli | 38 | SCM | IT | Freight | 213.9 | 31/12/2030 | | Medium (4665) | Medium (36677) | |
| Firenze - Terontola - Attigliano - Settebagni | 37 | SCM | IT | Freight | 291.5 | 31/12/2026 | | Medium (7888) | Low (23743) | |
| Venezia - Ronchi dei Legionari Sud | 37 | BAC - MED | IT | Passenger | 117.5 | 31/12/2030 | | No Traffic Data | No Traffic Data | |
| Villa San Giovanni - Palermo/Augusta | 36 | SCM | IT | Passenger and freight | 351.0 | 31/12/2030 | | Low (943) | Low (17990) | |
| **Total Length without ETCS activity (km))** | | | | | **3655.7** | | | | | |
| **Total gaps priority (km)** | | | | | **469.4** | | | | | |

### 5.14.1 *Sketch with the priority gaps*




MEDITERRANEAN CORRIDOR
Passenger and Freight
FR
IT
Saint-Laurent-de-Mure
Modane
Chambéry
Orbassano
Torino
Chivasso
Novara
Rho
Milano
Milano
Melzo
Verona
(1)
Vicenza
Bologna
Padova
Ravenna
Mirano
Venezia
(1)
(1)
Cervignano
(1)
Ronchi dei Legionari
(1)
Bivio d'Aurisina
Trieste
Villa Opicina
IT
SI
Sežana
ETCS in Operation
ETCS under Construction
Funded CEF
Key gaps by 2023 EDP
Key gaps beyond 2023 EDP
Planned by 2023 EDP
Planned beyond 2023 EDP




### *5.14.2 **Priority gaps***

***Ronchi dei Legionari Sud - Villa Opicina - Border IT/SI (Sežana)***

This line belongs to BAC and MED Corridors. In this Corridors, there are two lines connecting Italy and Slovenia: the conventional line, which does not belong to any CNC and the high-speed line which is planned for both types of traffic (passengers and freight) and belongs to the CNC. Currently, the conventional line is already funded by the CEF project 2015-IT-TM-0168-W. Even so, the high-speed line should be selected as a priority gap because it connects Italy and Slovenia. Furthermore, the Slovenian side of the cross-border section is already in operation.

***Settebagni – Roma***

The line Settebagni – Roma belongs to the SCM Corridor. This line should be selected as a priority gap because it connects the Bologna – Settebagni and Roma – Napoli lines, which have sections with ETCS in operation and sections with ETCS under construction. Furthermore, this line is the busiest for passengers traffic compared to the rest of the gaps.

***Border AT/IT (Brennero base tunnel) – Fortezza***

This line belongs to the SCM Corridor. This line should be selected as a priority gap because it would allow connection between the Austrian border and Italy by a high-speed line. Furthermore, the Austrian side of the cross- border has also been selected as a priority gap.

***Bologna node***

The Bologna node belongs to the BAC, MED and SCM Corridors. This node in the SCM Corridor connects the lines Firenze – Bologna and Verona – Bologna which have the ETCS in operation and is funded by a CEF project, respectively. For this reason, this line should be selected as a priority gap.

***Fortezza – Verona***

There are two lines connecting Italy and Austria: the conventional line that does not belong to any CNC and is already funded by the CEF project 2015-IT-TM-0168-W and the high-speed line that belongs to the RALP Corridor.

In this case, the high-speed line is proposed as a priority gap, since it belongs to the RALP Corridor and the Verona - Napoli line with the Austrian border and also it has ETCS activity and crosses the capital city of the country, Rome.

***Verona node***

The Verona node belongs to the MED and SCM Corridors. This node in the SCM Corridor connects the Brennero - Verona and Frotezza – Verona lines. The first one has ETCS under construction and the second one is funded by a CEF project. For this reason, this line should be selected as a priority gap.

***Firenze Castello - Firenze Campo di Marte***

The Firenze Castello - Firenze Campo di Marte line belongs to the SCM Corridor. This line is located within the Firenze Node and connects the lines Bologna – Firenze and Settebagni – Firenze. The first one has ETCS in operation and it is under construction in the second one. For this reason, this line should be selected as a priority gap.

***Border FR /IT (Modane) - Orbassano – Torino***

In the Mediterranean Corridor there are two lines which connecting France with the Italian border. The first one is the conventional line (Border FR/IT (Modane) - Torino) which has already built the infrastructure. The second one is the high- speed line (Border FR /IT (Modane) - Orbassano – Torino) which is a new construction and is intended to have mixed traffic (passengers and freight).

Although the conventional line has a higher score in the table above given that the infrastructure is already built, the high-speed line Border FR /IT (Modane) - Orbassano – Torino should be selected as a priority gap. This is because this line will absorb the traffic of the conventional line in the future, as it is intended to have mixed traffic. Furthermore, this line connects the French side of the cross-border section and the high-speed Torino – Novara line, which is already equipped with operative ETCS. In addition, the French side of the cross-border section has also been selected as a priority gap.

***Rho – Milano***

The Rho – Milano line belongs to the MED and RALP Corridors. This line should be selected as a priority gap because it connects the Torino – Rho and Milano – Padova lines, the first one having ETCS in operation and the second one being funded by a CEF Project.

***Venezia node***

The Venezia node belongs to the BAC and MED Corridors. It is part of a line which is already funded by the CEF Project 2016-IT-TM-0244-W, except for the section connecting Venezia Mestre and Venezia port. This gap belongs to the BAC Corridor and should be selected as a priority gap because it is the busiest for passenger traffic compared to the rest of the gaps.

***Portogruaro – Venezia***

The Portogruaro – Venezia line belongs to the BAC and MED Corridors. Although the comprehensive line Vicenza-Castelfranco-Treviso – Portogruaro is already funded by the CEF project 2015-IT-TM-0168-W and is connected to the Vicenza- Milano line and the one to the Slovenian border. Despite this, the Portogruaro – Venezia line should be selected as a priority gap because it connects the Venezia node with the Slovenian border. Furthermore, this line allows a direct connection between France and Slovenia in the MED Corridor, via Italy.

### *5.14.3 **Gaps discarded***

This section describes the lines which have a high score according to the methodology explained in Section 3 but that are however rejected for the reasons stated below.

***Border AT/IT (Thoerl-Maglern) – Udine – Privano – Cervignano***

This line belongs to the BAC Corridor and connects the Austrian border with Cervignano, which has direct connection with the Austrian border. However, this line was not considered as a priority gap because the Austrian side of the cross-border section do not have any ETCS activity and was not considered a priority gap either.

## *5.15 **Latvia***

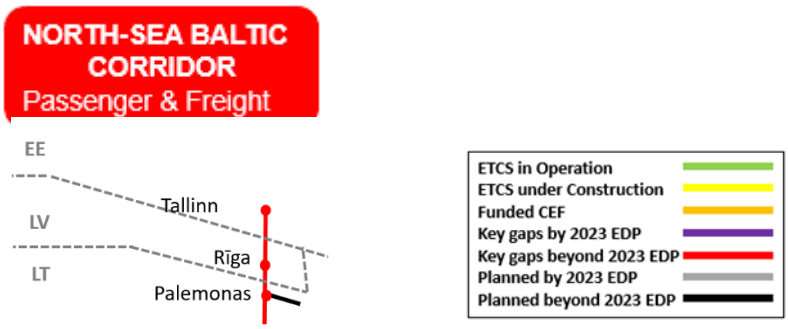
Latvia has no lines with ETCS in operation, under construction or with CEF projects assigned. In addition, it is located between Lithuania and Estonia, which are both in the same situation. All Latvian CNC railway network is expected to be equipped with working ETCS after 2023 and some lines are exempt from implementing this system before 2030. More specifically, 594 km of lines should have operating ETCS by 2030 and 367 km of lines are expected to deploy this traffic control system beyond this year. Therefore, the whole railway network was considered a gap.

The following table shows all the identified gaps in Latvia, i.e. lines that are not in operation, under construction or funded with a CEF project in CNC. According to the criteria and methodology explained in Section 4, gaps are listed from the highest to the lowest priority gaps. Lines highlighted in blue are the gaps to be prioritised in Latvia.

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Meitene (border LT/LV) - Jegalva - Riga | 72 | NSB | LV | Passenger and freight | 77.0 | 31/12/2036 | X | Medium (3990) | Medium (13930) | Conventional line |
| Riga - Valka (border LV/EE) | 67 | NSB | LV | Passenger and freight | 165.1 | 31/12/2036 | X | Medium (4650) | High (22870) | Conventional line |

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Jegalva - Ventspil | 47 | NSB | LV | Passenger and freight | 162.3 | 31/12/2036 | | High (8173) | Low (0) | This section allows connection between Jegalva (close to Riga) and Ventspil (port in the Baltic sea). It does not appear on the schematic map. |
| Riga - Border LV/LT (Bauska) | 36 | NSB | LV | Passenger and freight | 71.2 | 31/12/2030 | X | No Traffic Data | No Traffic Data | This is the high-speed line belonging to Rail Baltica |
| Border EE/LV (Moisakula) – Riga | 31 | NSB | LV | Passenger and freight | 118.2 | 31/12/2030 | X | No Traffic Data | No Traffic Data | This is the high-speed line belonging to Rail Baltica |
| **Total Length not expected in the short (km))** | | | | | **593.8** | | | | | |
| **Total gaps priority (km)** | | | | | **189.4** | | | | | |

### *5.15.1 **Sketch with the priority gaps***




### *5.15.2 **Priority gaps***

***Riga - Border LV/LT (Bauska)***

There are two railway lines connecting Lithuanian and Latvia: The first one is the conventional Meitene (border LT/LV) - Jegalva – Riga line and the second ones is the high-speed Riga - Border LV/LT (Bauska) line which belongs to Rail Baltica.

Although the conventional line has a higher score in the table above given that the infrastructure is already built and there is traffic flow information available, the high-speed Riga - LV/LT (Bauska) border line should be selected as a priority gap because

it belongs to Rail Baltica and in the future this section will absorb the traffic from the conventional line. Furthermore, this section provides a direct connection between Riga and the Polish border.

***EE/LV (Moisakula) border – Riga***

There are two lines connecting Estonia and Latvia: the first one is the conventional Riga - Valka (LV/EE border) line and the second one is the high-speed EE/LV (Moisakula) border – Riga line, which belongs to Rail Baltica.

Despite the conventional line having a higher score in the table above given that the infrastructure is already built and has traffic information available, the high-speed line EE/LV (Moisakula) border – Riga should be selected as a priority gap. This is because it belongs to Rail Baltica and in the future this section will absorb the traffic from the conventional line and also provides a direct connection between Riga and the Estonian border.

### *5.16* ***Lithuania***

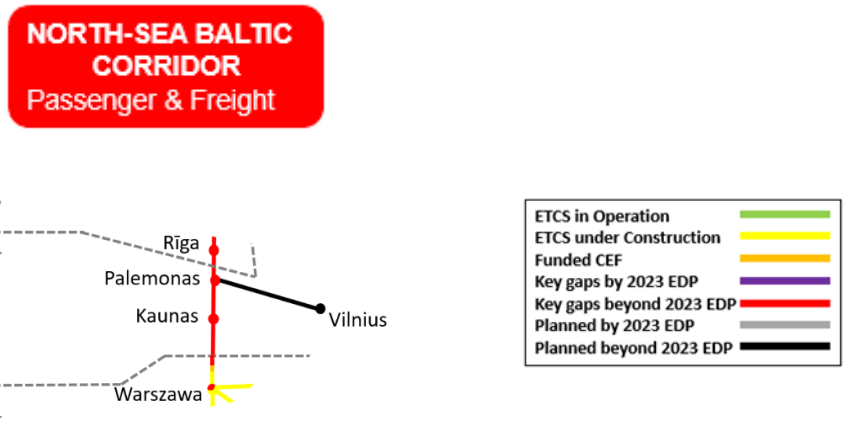
Lithuania has no lines with ETCS in operation, under construction or with a CEF project assigned. ETCS implementation is not expected to be finished before 2023 and some lines are exempt from having to fit this system by 2030. In particular, 481 km of lines should be ready before 2030 and the rest (around 370 km) have 2050 as deadline. Therefore, the whole railway network included in the CNC (NSB in this case) is considered as a gap.

The following table shows all the identified gaps in Lithuania, i.e. lines that are not in operation, under construction or funded with a CEF project in the CNC. According to the criteria and methodology explained in Section 5, gaps are listed from the highest to the lowest priority gaps. Lines highlighted in blue are the gaps to be prioritised in Lithuania.

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Palemonas - Kaunas - Border LT/PL (Mockava) | 64 | NSB | LT | Passenger and freight | 125.8 | 31/12/2026 | X | Medium (3667) | Low (2521) | Conventional line |
| Palemonas - State border (border LT/LV) | 64 | NSB | LT | Passenger and freight | 206.3 | 31/12/2050 | X | Medium (9245) | Low (2916) | Conventional line |
| Palemonas - Vilnius | 57 | NSB | LT | Passenger and freight | 92.7 | 31/12/2026 | | Medium (11562) | High (18388) | |
| Kaunas - Border LT/PL (Mockava) | 43 | NSB | LT | Passenger and freight | 81.7 | 31/12/2025 | X | No Traffic Data | No Traffic Data | This is the high-speed line belonging to Rail Baltica |
| Klaipeda - Siauliai | 43 | NSB | LT | Passenger and freight | 160.7 | 31/12/2050 | | Medium (10220) | Low (3650) | |
| Border LV/LT (Bauska) – Palemonas - Kaunas | 29 | NSB | LT | Passenger and freight | 181.2 | 31/12/2026 | X | No Traffic Data | No Traffic Data | This is the high-speed line belonging to Rail Baltica |
| **Total Length without** | | | | | **848.4** | | | | | |

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **ETCS activity (km)** | | | | | | | | | | |
| **Total gaps priority (km)** | | | | | **262.9** | | | | | |

*5.16.1* ***Sketch with the priority gaps***




*5.16.2* ***Priority gaps***

***Kaunas - Border LT/PL (Mockava)***

There are two lines connecting Lithuania and Polonia: the conventional Palemonas - Kaunas - Border LT/PL (Mockava) line and the high-speed Kaunas - Border LT/PL (Mockava) line which belongs to Rail Baltica.

Despite the conventional line having a higher score in the table above given that the infrastructure is already built and there is traffic information available, the high-speed Kaunas - Border LT/PL (Mockava) line should be selected as a priority gap. The reason for this is that it belongs to Rail Baltica, in the future this section will absorb the traffic from the conventional line and it provides a direct connection between Lithuania and the Polish border.

***Border LV/LT (Bauska) – Palemonas***

There are two lines connecting Lithuanian and Latvia: the conventional Palemonas - State border (border LT/LV) line and the high-speed line Border LV/LT (Bauska) – Palemonas line, which belongs to Rail Baltica.

Despite the conventional line having a higher score in the table above given that the infrastructure is already built and there is traffic information available, the high-speed Border LV/LT (Bauska) – Palemonas line should be selected as a priority gap. This is because it belongs to Rail Baltica, in the future this section will absorb the traffic from the conventional line and it provides a direct connection between Lithuania and the Polish border.

### *5.17 **Luxembourg***

Luxembourg already has an ETCS deployment foreseen without any gap in the CNC. No lines to be prioritised.

### *5.18 **The Netherlands***

The Netherlands have a mix of ETCS deployment categories. On the one hand, the ETCS deployment of the NSB Corridor are categorised as ETCS Islands because it is focused on specific stretches as shown in the sketch in Section 5.18.1. The lines belonging to the RALP and NSM Corridors are classified as ETCS network with gaps because in these ETCS is not expected to be under deployment in the short term.

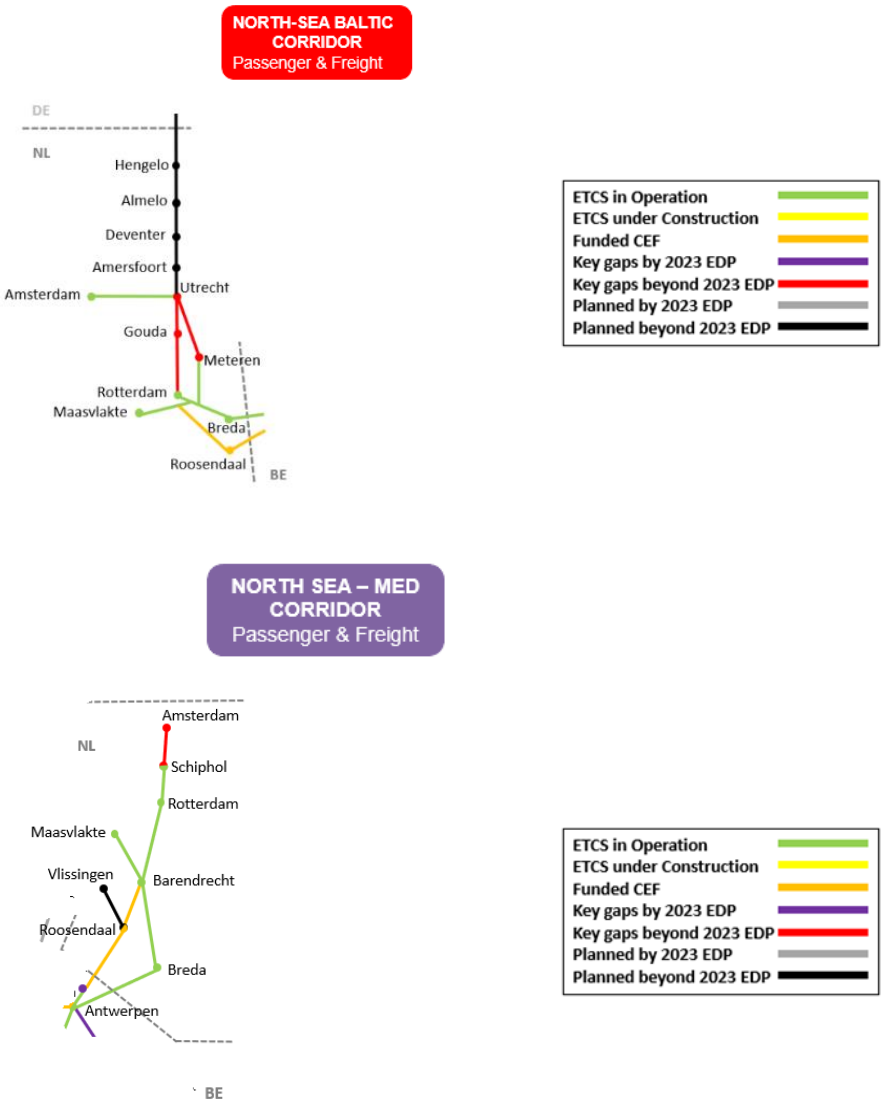
According to the EDP, this MS should equip with ETCS 770 km of lines belonging to the CNC by 2030. Of this length, 413 km are not expected to be under construction or in operation in the short term. The result is the prioritisation of 94 km. The reasons why these gaps were selected as a priority sections are explained below.

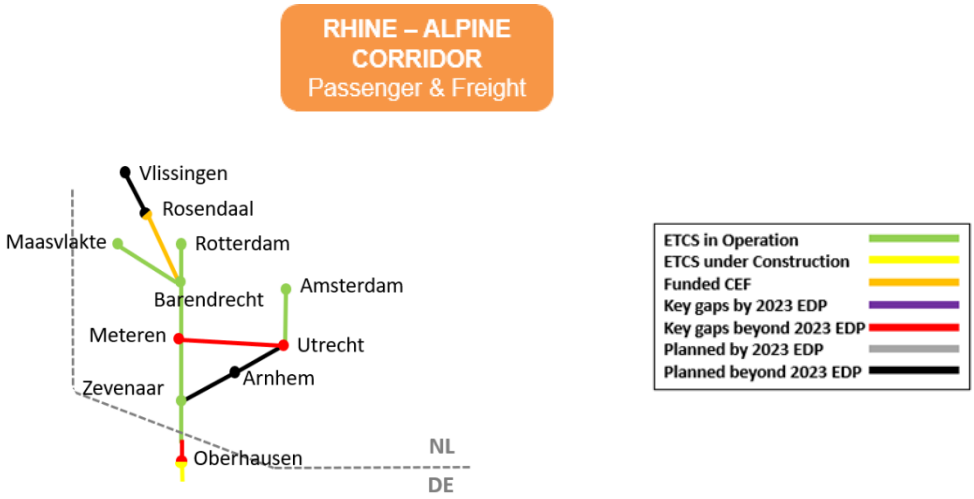
The following table shows all the identified gaps in The Netherlands, i.e. lines that are not in operation, under construction or funded with a CEF project in the CNC. According to the criteria and methodology explained in Section 4, gaps are listed from the highest to the lowest priority gaps. Lines highlighted in blue are the gaps to be prioritised in The Netherlands.

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Meteren - Utrecht | 80 | NSB - RALP | NL | Freight | 25.8 | 31/12/2029 | | Medium (11063) | Medium (110413) | |
| Utrecht - Gouda - Rotterdam | 75 | NSB | NL | Passenger | 52.7 | Beyond 2030 | | Medium (7931) | High(128526) | |
| Border DE/NL (German border II) - Utrecht node | 64 | NSB | NL | Passenger and freight | 153.7 | Beyond 2030 | X | Medium (7481) | Low(55302) | |
| Amsterdam - Schipol | 62 | NSM | NL | Passenger | 15.5 | 31/12/2029 | | Medium (6150) | Low(30275) | |
| Rotterdam | 62 | NSB - NSM | NL | Passenger and freight | 3.8 | Beyond 2030 | | High(13197) | High(149180) | This node has a section already in operation, and this section allows a continuous communication between the line Breda – Gouda. However, a section of this node has a no ETCS activity, but this section connects the Rotterdam station and a section which does not belong to the CNC corridor |
| Utrecht node - Zevenaar | 58 | RALP | NL | Passenger | 67.7 | 31/12/2030 | | Medium (3466) | Medium (66202) | |

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Vlissingen - Roosendal | 53 | RALP - NSM | NL | Freight | 93.6 | Beyond 2030 | | Medium (4824) | Low(25631) | |
| **Total Length not expected in the short (km)** | | | | | **412.8** | | | | | |
| **Total gaps priority (km)** | | | | | **94.0** | | | | | |

### *5.18.1 **Sketch with the priority gaps***






### *5.18.2* ***Priority gaps***

***Meteren - Utrecht***

There are two lines planned in the North Sea – Baltic Corridor between Rotterdam and Utrecht: one for passengers (Utrecht - Gouda – Rotterdam) and another one dedicated to freight traffic (Rotterdam - Meteren – Utrecht). Nowadays, the freight line is partially equipped with ETCS in operation.

The freight line Rotterdam - Meteren – Utrecht should be selected as a priority gap because it is already partially fitted with ETCS in operation and the remaining length (25km) is small compared to the length of the other gaps. In addition, this line connects the capital city of the country, Amsterdam with the German side of the cross-border section.

***Utrecht - Gouda – Rotterdam***

The Utrecht - Gouda – Rotterdam line belongs to the NSB Corridor. Despite the line described above being an alternative route to this one, it is proposed as a priority gap because it the busiest gap regarding passenger traffic. Additionally, this gap provides a connection for passenger services between Amsterdam and the German side of the cross-border section.

***Amsterdam – Schiphol***

The Amsterdam – Schipol line belongs to the NSM Corridor. It should be selected as a priority gap because it connects the capital city of the country, Amsterdam, with the Belgium border. The Schiphol – Antwerpen line is already fitted with ETCS in operation.

### *5.18.3* ***Gaps discarded***

This section describes the lines which have a high score according to the methodology explained in Section 3 that are however rejected for the reasons stated below.

***Border DE/NL (German border II) - Utrecht node***

The Border DE/NL (German border II) - Utrecht node line belongs to the NSB Corridor. This line should be selected as a priority gap because it connects Germany and The Netherlands. However, the German side of the cross-border section has not

been selected as a priority gap. Furthermore, there is already a connection between Germany and The Netherlands proposed in this document as a priority gap in the RALP Corridor so a connection between these two countries is already guaranteed.

### *5.19* ***Poland***

Poland has a mix of ETCS deployment categories. On the one hand, according to the ETCS deployment of the BAC Corridor, the Gdynia- Zawiercie and Poznan- Opole lines are considered ETCS. islands. On the other hand, most of the sections belonging to the NSB Corridor are currently with ETCS under construction so it can be classified as ETCS network with gaps.

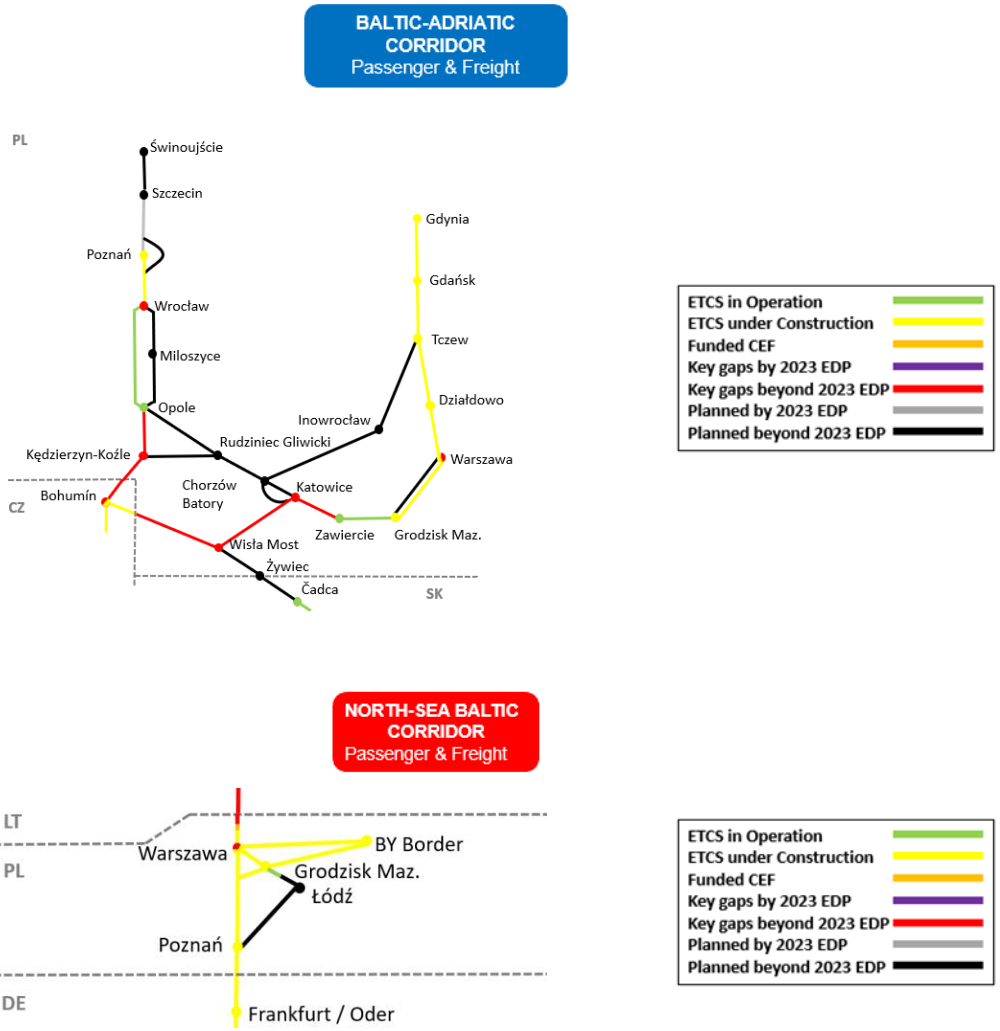
According to the EDP, this MS should equip with ETCS 3,762 km of lines belonging to the CNC by 2030. Of this length, 1,713 km are not expected to be under construction or in operation in the short term. The result is the prioritisation of 324 km. The reasons why these gaps were selected as a priority sections are explained below.

The following table shows all the identified gaps in Poland, i.e. lines that are not in operation, under construction or funded with a CEF project in the CNC. According to the criteria and methodology explained in Section 4, gaps are listed from the highest to the lowest priority gaps. Lines highlighted in blue are the gaps to be prioritised in Poland.

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/ year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Most Wisla - Border PL/CZ (Zebrzydowice) | 81 | BAC | PL | Passenger and freight | 33.4 | 31/12/2026 | X | High(20445) | Low(8355) | |
| Opole - Kedzierzyn Kozle - Border PL/CZ (Bohumin) | 79 | BAC | PL | Passenger and freight | 95.3 | 31/12/2027 | X | Medium (12728) | Low(10085) | |
| Border LT/PL (Mockava) - Warszawa | 74 | NSB | PL | Passenger and freight | 94.1 | 31/12/2024 | X | Low(2671) | Low(7175) | The total length of the section is 362 km are funded by the CEF projects 2016-PL-TMC-0135-W, the rest of the line is already with ETCS under construction |
| Warszawa | 73 | NSB | PL | Passenger and freight | 8.4 | 31/12/2028 | | Medium (3870) | High(98671) | The total length of the section is 34 km and the rest of the line is already with ETCS under construction . |
| Wroclaw | 67 | BAC | PL | Passenger and freight | 7.4 | 31/12/2030 | | Low(996) | Medium (41146) | |

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/ year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Most Wisla - Zawiercie | 57 | BAC | PL | Passenger and freight | 85.7 | 31/12/2027 | | Medium (4236) | Medium (40589) | |
| Opole (Groszowice)- Katowice | 56 | BAC | PL | Passenger | 103.6 | 31/12/2027 | | Medium (5801) | Low(12083) | |
| Poznan (Kiekrz - Lubon Koto Poznania) | 54 | BAC - NSB | PL | Passenger and freight | 22.7 | 31/12/2023 | | Medium (12779) | Low(882) | The total length of the section is 34 km. The rest of the line is equipped with ETCS already under construction |
| Tczew - Rudziniec Gliwick | 53 | BAC | PL | Passenger and freight | 514.0 | 31/12/2027 | | Medium (16032) | Low(7122) | |
| Most Wisla - Border PL/SK (Zywiec) | 51 | BAC | PL | Passenger and freight | 70.9 | 31/12/2027 | X | Low(612) | Low(12508) | |
| Poznan-Swinousjscie | 49 | BAC | PL | Passenger and freight | 307.5 | 31/12/2030 | | Medium (7416) | Low(18591) | This section is funded by 2014-PL-TMC-0198-W. However, the ERTMS part of this project was removed |
| Szeligi - Łódź | 37 | NSB | PL | Passenger | 74.0 | 31/12/2030 | | No Traffic Data | No Traffic Data | This section is inside the route Grodzisk Maz - Łódź |
| Opole - Wroclaw | 37 | BAC | PL | Freight | 95.5 | 31/12/2030 | | Medium (6748) | Low(2254) | This section included the Wroclaw node |
| Łódź - Poznań | 31 | NSB | PL | Passenger | 200.5 | 31/12/2030 | | No Traffic Data | No Traffic Data | |
| **Total Length not expected in the short (km)** | | | | | **1713.2** | | | | | |
| **Total gaps priority (km)** | | | | | **324.4** | | | | | |

### 5.19.1 *Sketch with the priority gaps*




### 5.19.2 *Priority gaps*

#### *Most Wisla - Border PL/CZ (Zebrzydowice)*

The Most Wisla - Border PL/CZ (Zebrzydowice) line belongs to the BAC Corridor. This line connects Poland with The Czech Republic and it is the busiest freight line in the country compared to all the other lines (either in operation or under construction) in the CNC, which is why it is considered a priority gap.

#### *Opole - Kedzierzyn Kozle - Border PL/CZ (Bohumin)*

The Opole - Kedzierzyn Kozle - Border PL/CZ (Bohumin) line belongs to the BAC Corridor. This line may be a priority gap because it connects Poland and The Czech Republic from Kedzierzyn Kozle and because it is the fourth busiest freight line in the CNC in Poland. Furthermore, since the line between Worclaw and Opale is already in operation, if this gap were prioritised, the connection between Worclaw and the The Czech Republic would be enabled.

***Border LT/PL (Mockava) – Warszawa***

The Border LT/PL (Mockava) – Warszawa line belongs to the BAC Corridor and Rail Baltica. This line has a total length of 362 km, 268 km of which are funded by CEF projects 2016-PL-TMC-0135-W and 2014-PL-TMC-0182-W. However, 94 km are not funded by any CEF project and they should be considered as a priority gap because their finalisation would enable the connection between Poland and Lithuania.

***Warszawa node***

The Warszawa node belongs to the BAC and NSB Corridors. Part of it has ETCS under construction, which will provide continuous connection between the line Grodzisk Maz and Działdowo in the BAC Corridor. However, if this node is selected as a priority gap in the NSB Corridor, it would also provide a continuous connection between the lines between Poznań and Warszawa and the border with Lithuania.

***Wroclaw node***

The Wroclaw node belongs to the BAC Corridor. This node should be selected as a priority gap because it connects the Opole – Wroclaw line, which is already equipped with ETCS in operation, to the Wroclaw – Poznań line, where ETCS is under construction.

***Most Wisla – Zawiercie***

The Most Wisla – Zawiercie line belongs to the BAC Corridor. Since the Zawiercie – Grodzisk Maz line is already equipped with ETCS in operation and the Grodzsik Maz – Gdynia line is under construction, bridging this gap would enable the connection of more than 1,300 km of lines with the rest of Europe and the capital city of the country, Warszawa.

### *5.20* ***Portugal***

Portugal has an ETCS deployment category of ETCS island, which means that the ETCS deployment focuses on specific areas, particularly the cross-border lines with Spain.

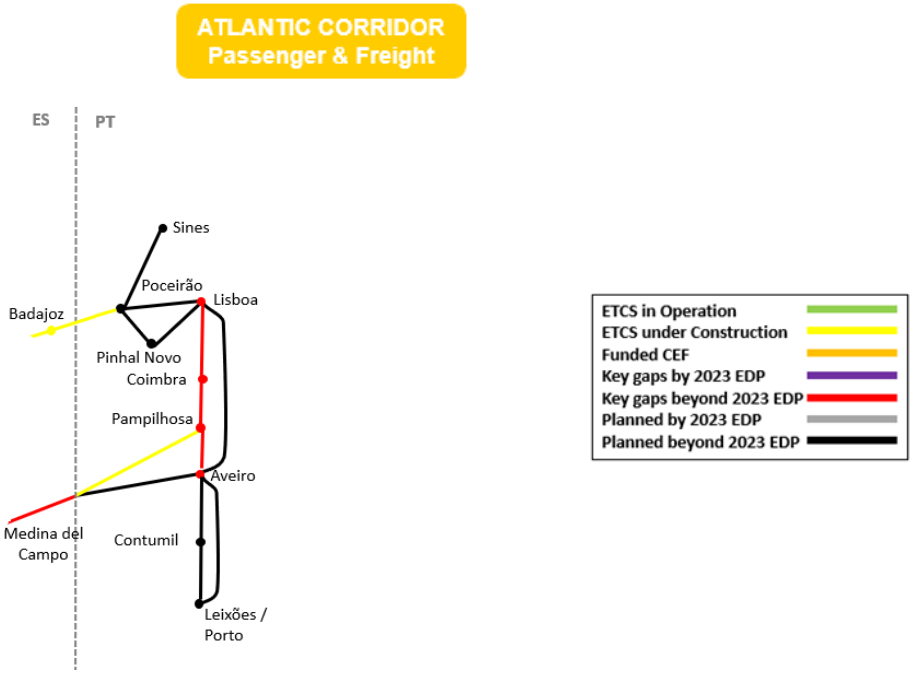
According to the EDP, Portugal should equip 1,534 km of lines belonging to the CNC with ETCS by 2030. Of this length, 1,246 km are not expected to be under construction or in operation in the short term. The result is the prioritisation of 283 km. The reasons why those gaps were selected as a priority sections are explained below

The following table shows all the identified gaps in Portugal, i.e. lines that are not in operation, under construction or funded with a CEF project in the CNC. According to the criteria and methodology explained in Section 4, gaps are listed from the highest to the lowest priority gaps. Lines highlighted in blue are the gaps to be prioritised in Portugal.

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Pampilhosa - Aveiro | 70 | ATL | PT | Freight | 55.5 | 31/12/2030 | | High(8664) | Medium (25176) | |
| Lisboa - Coimbra - | 58 | ATL | PT | Freight | 227.4 | 31/12/2030 | | Medium (5890) | High(48235) | |

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Pampilhosa | | | | | | | | | | |
| Poceirão - Sines | 56 | ATL | PT | Unselected | 147.8 | 31/12/2030 | | High(9051) | Low(3544) | |
| Aveiro - Contumil - Leixões/Porto | 55 | ATL | PT | Freight | 83.0 | 31/12/2030 | | Medium (6297) | Medium (26966) | |
| Poceirão - Lisboa | 42 | ATL | PT | Passenger | 114.8 | 31/12/2020 | | No Traffic Data | No Traffic Data | |
| Evora - Poceirão - Pinhal Novo - Lisboa - Porto de Lisboa | 42 | ATL | PT | Freight | 176.7 | 31/12/2030 | | Medium (3280) | Medium (23027) | |
| Aveiro - Porto (Contumil) | 34 | ATL | PT | Passenger | 68.0 | 31/12/2030 | | No Traffic Data | No Traffic Data | |
| Border ES/PT (Medina del campo) - Aveiro | 34 | ATL | PT | Passenger | 164.2 | 31/12/2030 | X | No Traffic Data | No Traffic Data | |
| Aveiro - Lisboa | 26 | ATL | PT | Passenger | 208.3 | 31/12/2030 | | No Traffic Data | No Traffic Data | |
| **Total Length not expected in the short (km)** | | | | | **1,245.7** | | | | | |
| **Total gaps priority (km)** | | | | | **282.9** | | | | | |

### 5.20.1 *Sketch with the priority gaps*




### 5.20.2 *Priority gaps*

***Pampilhosa – Aveiro***

The Pampilhosa – Aveiro line belongs to the ATL Corridor. This line should be selected as a priority gap because it is the busiest freight traffic line from all those belonging to the CNC.

***Lisboa - Coimbra - Pampilhosa***

The Lisboa - Coimbra – Pampilhosa line belongs to the ATL Corridor. This line should be selected as a priority gap because it connects the Spanish border with the capital city of the country, Lisboa. Furthermore, this line is the busiest line for passenger traffic of all those belonging to the CNC. In addition, the Spanish side of the cross-border section is currently being fitted with ETCS.

## 5.21 *Romania*

Romania is categorised as an ETCS island because the ETCS deployment is focussed on specific areas, particularly on the cross-border sections with the neighbouring countries.

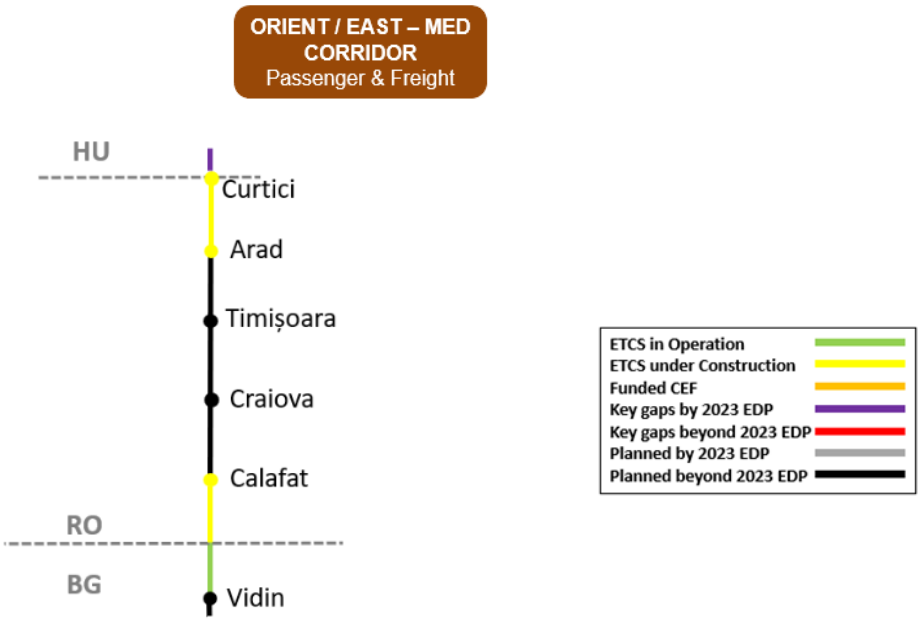
According to the EDP, this MS should equip 1,812 km of lines belonging to the CNC with ETCS by 2030. Of this length, 1,064 km are not expected to be under construction or in operation in the short term. The result is the prioritisation of 368 km. The reasons why those gaps were selected as a priority sections are explained below.

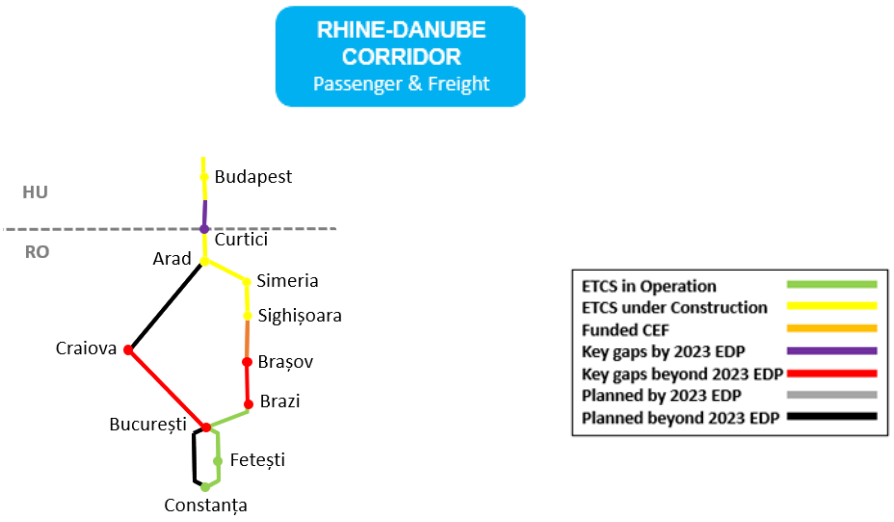
The following table shows all the identified gaps in Romania, i.e. lines that are not in operation, under construction or funded with a CEF project in the CNC. According to the criteria and methodology explained in Section 4, gaps are listed from the highest

to the lowest priority gaps. Lines highlighted in blue are the gaps to be prioritised in Romania.

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Craiova - București | 70 | RDN | RO | Passenger and freight | 251.5 | 31/12/2025 | | High(12849) | High(19409) | |
| Brașov - Brazi | 69 | RDN | RO | Passenger and freight | 116.6 | 31/12/2025 | | Medium (9729) | High(20565) | |
| Arad - Craiova | 64 | OEM - RDN | RO | Passenger and freight | 383.9 | 31/12/2025 | | High(11301) | Medium (14928) | |
| Craiova - Calafat | 60 | OEM | RO | Passenger and freight | 100.3 | 31/12/2025 | | Medium (7272) | Low(1823) | |
| București - Constanța | 35 | RDN | RO | Passenger | 211.3 | 31/12/2025 | | No Traffic Data | No Traffic Data | |
| **Total Length not expected in the short (km)** | | | | | **1,063.5** | | | | | |
| **Total gaps priority (km)** | | | | | **368.1** | | | | | |

### *5.21.1* ***Sketch with the priority gaps***






### *5.21.2* ***Priority gaps***

***Craiova - București***

The Craiova - București line belongs to the RDN Corridor. This line is the second busiest line of the country among those within the CNC (including lines with ETCS in operation and under construction) for both types of traffic (passengers and freight). Furthermore, if this line were financed, it would provide access to the Craiova node and the Arad – Craiova and Craiova – Calafat lines, which would reduce the time of commissioning. All these reasons justify the consideration of this line as a priority gap.

***Brașov – Brazi***

The Brașov – Brazi line belongs to the RDN Corridor. This line should be a priority gap because it connects the capital city of the country, București, to the Hungarian side.

## *5.22* ***Slovakia***

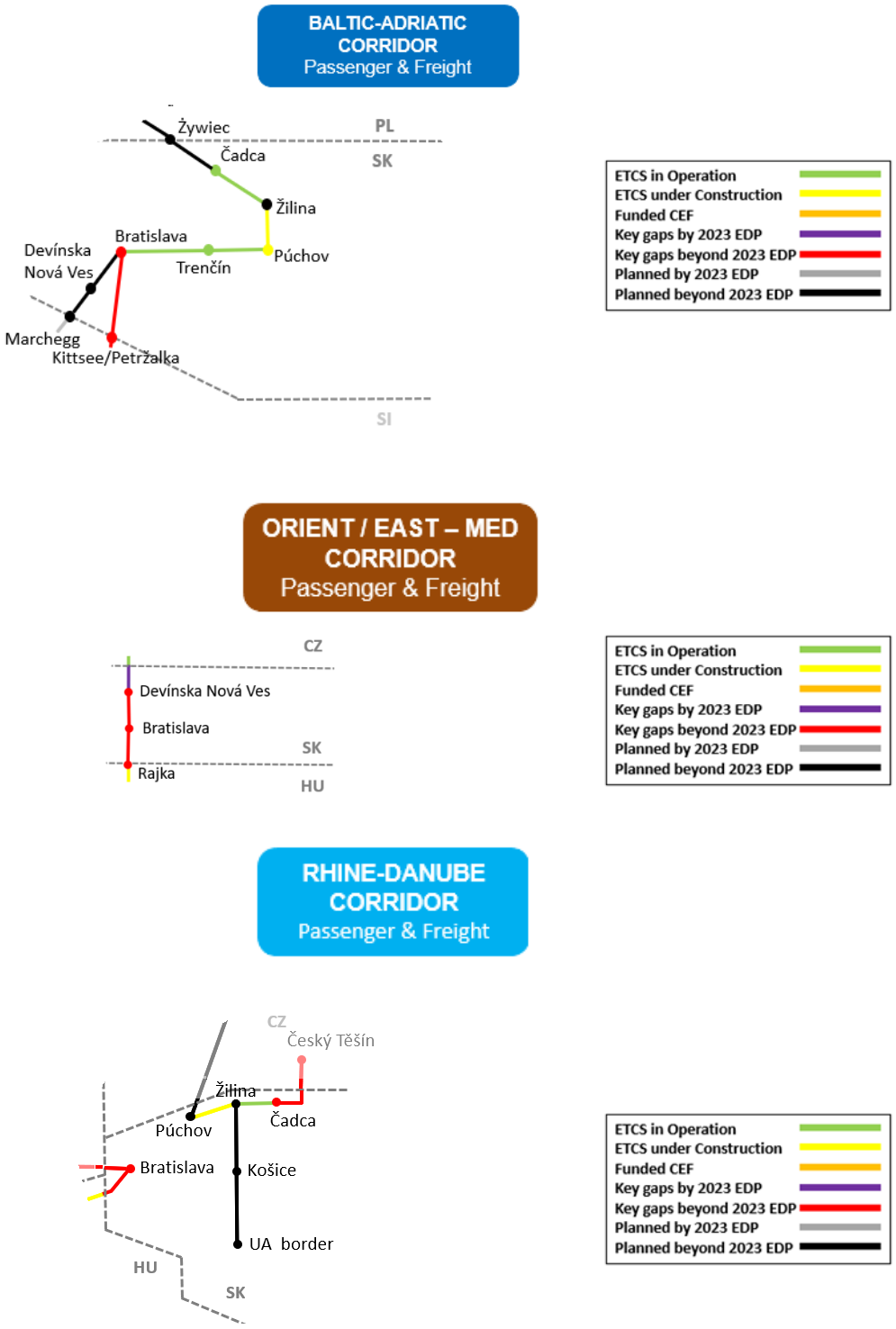
According to the ETCS deployment classification, Slovakia is considered as an ETCS island because there are long sections without ETCS in operation, under construction or with a CEF projects assigned.

This country has 729 km of CNC railway lines already equipped with ETCS and 496 km of lines without any type of deployment activity. From these 496 km, a total of 89 km are considered a priority gap.

The following table shows all the identified gaps in Slovakia, i.e. lines that are not in operation, under construction or funded with a CEF project in the CNC. According to the criteria and methodology explained in Section 4, gaps are listed from the highest to the lowest priority gaps. Lines highlighted in blue are the gaps to be prioritised in Slovakia.

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Bratislava - Border SK/AT (Petrzalka) | 79 | BAC - OEM - RDN | SK | Freight | 17.0 | 31/12/2030 | X | High(27586) | Low(41) | |
| Border CZ/SK (Lanzhot) - Devínska Nová Ves | 74 | OEM | SK | Passenger and freight | 56.1 | 31/12/2030 | X | Medium (19948) | Medium (22881) | |
| Bratislava - Border AT/SK (Devínska Nová Ves) | 73 | BAC - OEM | SK | Passenger | 20.4 | 31/12/2030 | X | Medium (17737) | High(33558) | |
| Border CZ/SK (Mosty u Jablunkova) - Čadca | 72 | RDN | SK | Passenger | 2.8 | 31/12/2030 | X | Medium (16191) | Medium (15948) | |
| Petrzalka - Border HU/SK (Petrzalka/Rajka) | 68 | OEM - RDN | SK | Passenger and freight | 13.2 | 31/12/2030 | X | Medium (9550) | Low(3) | |
| Žilina - Border SK/UA (Cop) | 62 | RDN | SK | Passenger and freight | 342.6 | 31/12/2030 | X | Medium (19488) | Medium (24031) | |
| Border PL/SK (Zywiec) - Čadca | 60 | BAC | SK | Passenger and freight | 16.1 | 31/12/2030 | X | Low(216) | Low(5520) | |
| Žilina node | 59 | BAC | SK | Freight | 8.0 | 31/12/2023 | | Low(2223) | Low(21) | |
| Border CZ/SK (Hranice/Púchov) - Púchov | 54 | RDN | SK | Freight | 20.5 | 31/12/2030 | X | Low(3821) | Low(10282) | |
| **Total Length not expected in the short (km))** | | | | | **496.7** | | | | | |
| **Total gaps priority (km)** | | | | | **89.2** | | | | | |

### *5.22.1* ***Sketch with the priority gaps***



#### *5.22.2 **Priority gaps***

***Bratislava - Border SK/AT (Petrzalka)***

This section belongs to the BAC and RDN Corridors. It would provide a continuous connection between Bratislava and the Austrian border and it is the busiest gap for freight traffic, reasons why it is considered a priority gap.

***Border CZ/SK (Lanzhot) - Devínska Nová Ves***

This section belongs to the OEM Corridor and would provide a continuous connection from Devínska Nová Ves and the Czech border and between the Czech and Austrian borders via Bratislava - Border AT/SK (Devínska Nová Ves) and Petrzalka - Border HU/SK (Petrzalka/Rajka) lines. This line is also one of the busiest sections for both passengers and freight traffic, which is why it is included in the list of priority gaps.

***Border CZ/SK (Mosty u Jablunkova) – Čadca***

This line belongs to the RDN Corridor. It connects Cadca to the Czech border and it is one of the busiest lines for both passengers and freight traffic, which are why it is proposed as a priority gap.

***Petrzalka - Border HU/SK (Petrzalka/Rajka)***

This line belongs to the OEM and RDN Corridors. It would allow the connection between Petrzalka and the Hungarian border. In addition, this line would provide a continuous connection between the Czech and Austrian borders via the Bratislava - AT/SK (Devínska Nová Ves) border and the CZ/SK (Lanzhot) border - Devínska Nová Ves lines. Furthermore, it is the busiest freight traffic line within a CNC in Slovakia, which is why it is proposed as a priority gap.

#### *5.22.3 **Gaps discarded***

This section describes the lines which have a high score according to the methodology explained in Section 3 but are, however, rejected for the reasons stated below.

***Bratislava - Border AT/SK (Devínska Nová Ves)***

There are two lines connecting Slovakia and Austria in the BAC and OEM Corridors: one crossing through the town of Devínska Nová Ves, which is planned for passenger traffic, and the other one crossing through Petrzalka, which is dedicated to freight traffic.

The passenger line should be selected as a priority gap according to the criteria explained in Section 4. However, this line is discarded because the Austrian side of the cross-border section does not have any ETCS activity and has not been selected as a priority gap either.

### *5.23 **Slovenia***

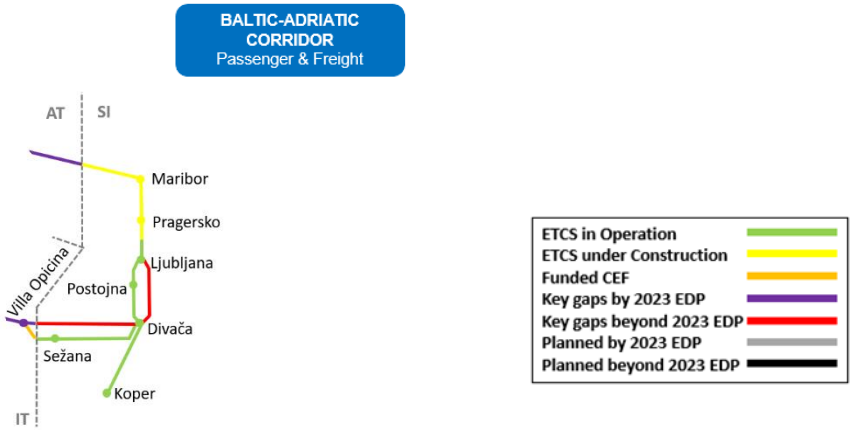
According to the ETCS deployment classification, Slovenia has an ETCS deployment category of ETCS network with gaps. This means that a limited number of lines in the country belonging to the CNC are not expected to have ETCS under construction or in operation in the short term. The two lines concerned are Divača – Ljubljana and Border IT/SI (Sežana) – Divača.

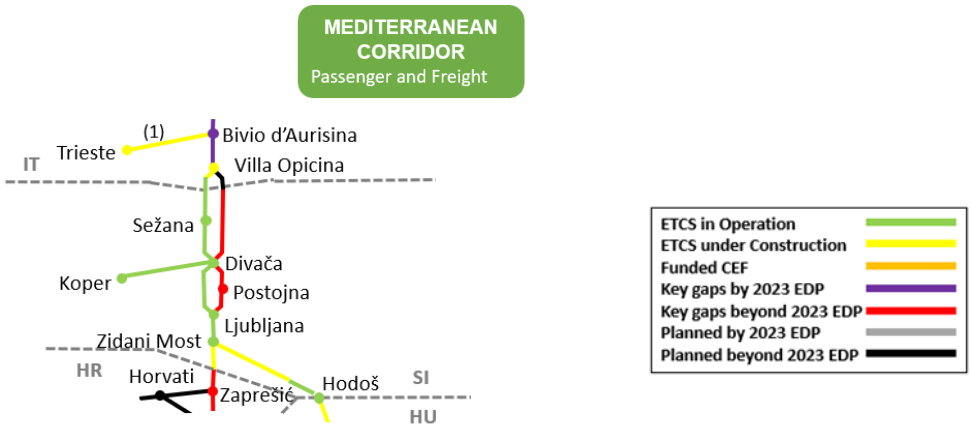
According to the EDP, this MS should equip 556 km of lines belonging to the CNC with ETCS by 2030. Of this length, 81 km are not expected to be under construction or in operation in the short term. Only 15% of the length of the lines within the corridor in Slovenia are not expected to be under construction in the short term. The result is the prioritisation of 81 km of lines for the reasons explained below.

The following table shows all the identified gaps in Slovenia, i.e. lines that are not in operation, under construction or funded with a CEF project in the CNC. According to the criteria and methodology explained in Section 4, gaps are listed from the highest to the lowest priority gaps. Lines highlighted in blue are the gaps to be prioritised in Slovenia.

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Border IT/SI (Sežana) – Divača | 46 | BAC – MED | SI | Passenger | 13.1 | 31/12/2030 | | No Traffic Data | No Traffic Data | |
| Divača – Ljubljana | 37 | BAC – MED | SI | Passenger | 67.7 | 31/12/2030 | | No Traffic Data | No Traffic Data | |
| **Total Length not expected in the short (km)** | | | | | **80.8** | | | | | |
| **Total gaps priority (km)** | | | | | **80.8** | | | | | |

### *5.23.1* ***Sketch with the priority gaps***






### *5.23.2 **Priority gaps***

The priority gaps in Slovenia are newly built lines that have already an alternative route equipped with ETCS in operation. These gaps are prioritised because they are the few remaining gaps in the country.

***IT/SI (Sežana) border – Divača***

There are two lines connecting Slovenia with the Italian border in the Mediterranean and Baltic Corridors: one is dedicated to passenger traffic and the other one is dedicated to freight. Currently the freight traffic line is already in operation and accommodates mixed traffic (passenger and freight traffic on the same line). The high-speed line is proposed as a priority gap, despite not closing any gap, because it would enable the diversion of traffic from the operating line to this one providing in this way more operational flexibility.

***Divača – Ljubljana***

There are two lines planned in the Mediterranean and Baltic Corridors between Divača and Ljubljana: one for passengers and one for freight traffic. Currently, the freight line is already in operation and supports mixed traffic. The high-speed line is proposed as a priority gap, despite not closing any gap, because it would enable the diversion of traffic from the operating line to this one, thereby providing more operational flexibility.

## *5.24 **Spain***

Spain can be classified as an ETCS Island, which means ETCS deployment focuses on specific areas as shown in the sketch in Section 5.24.1.

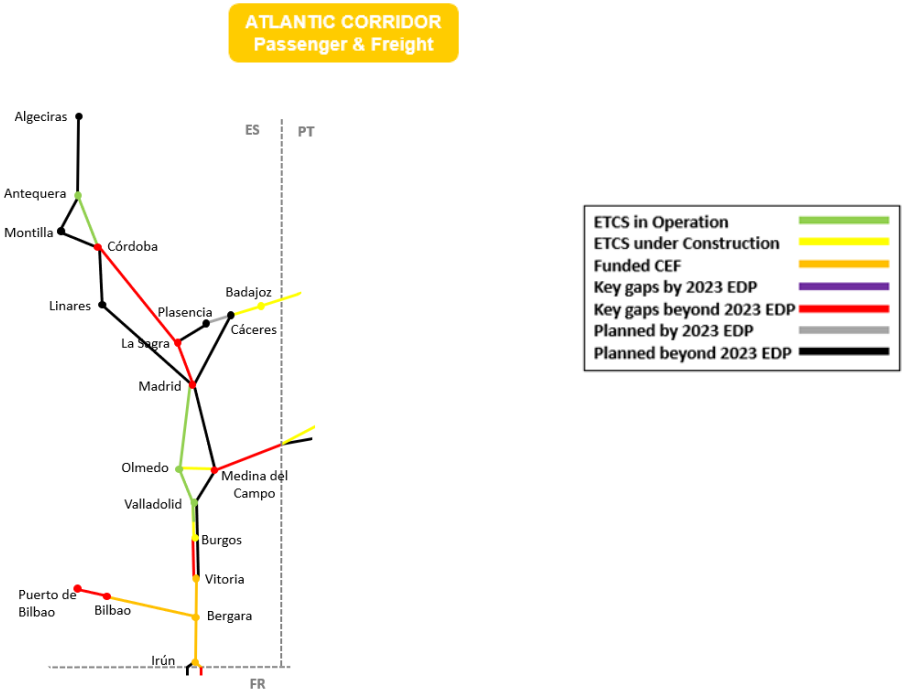
According to the EDP, this MS should equip 6,320 km of lines belonging to the CNC with ETCS by 2030. Of this length, 4,064 km are not expected to be under construction or in operation in the short term. The result is the prioritisation of 624 km for the reasons explained below.

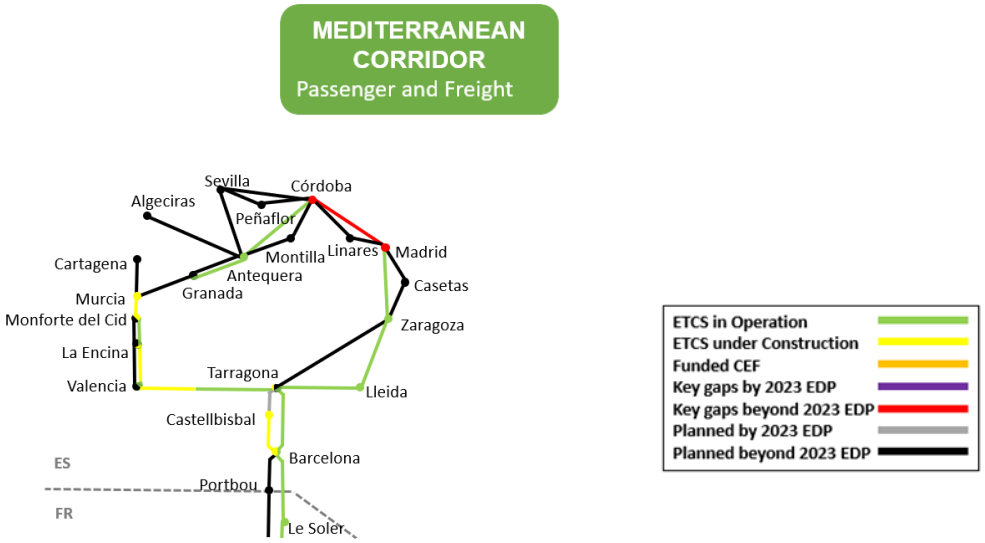
The following table shows all the identified gaps in Spain, i.e. lines that are not in operation, under construction or funded with a CEF project in the CNC. According to the criteria and methodology explained in Section 4, gaps are listed from the highest to the lowest priority gaps. Lines highlighted in blue are the gaps to be prioritised in Spain.

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Medina del Campo – Border ES/PT (Aveiro) | 66 | ATL | ES | Passenger and freight | 200.6 | 31/12/2030 | | Medium (2228) | Low(2672) | |
| Burgos – Vitoria (High speed) | 61 | ATL | ES | Passenger and freight | 30.9 | 31/12/2030 | | No Traffic Data | No Traffic Data | |
| Bergara - Irún (Border ES/FR) | 58 | ATL | ES | Freight | 18.1 | 31/12/2023 | | Medium (4621) | High(32654) | The CEF project 2015-ES-TM-0118-W finance the high-speed line for passenger |
| Córdoba – La Sagra – Madrid | 58 | MED – ATL | ES | Passenger | 378.2 | 31/12/2030 | | Low(236) | Medium (24291) | |
| Bilbao – Puerto de Bilbao | 55 | ATL | ES | Freight | 14.7 | 31/12/2030 | | Medium (5074) | Low(8) | |
| Madrid – Vitoria | 54 | ATL | ES | Freight | 506.1 | 31/12/2030 | | High(6701) | Medium (15128) | |
| Sevilla – Peñaflor – Córdoba | 51 | MED | ES | Freight | 117.2 | 31/12/2030 | | Medium (2825) | Medium (15009) | |
| La Llagosta – Nudo Mollet – Castellbisball | 50 | MED | ES | Freight | 2.3 | 31/12/2020 | X | No Traffic Data | No Traffic Data | The total length of the section is 24 and the rest of the line is under construction |
| Barcelona – Border ES/FR (Portbou) | 49 | MED | ES | Freight | 151.3 | 31/12/2030 | | Medium (4385) | Medium (13326) | |
| Sevilla – Córdoba | 49 | MED | ES | Passenger | 102.7 | 31/12/2030 | | No Traffic Data | No Traffic Data | |
| Córdoba – Montilla – Antequera (Fuente de Piedra) | 47 | MED – ATL | ES | Freight | 109.1 | 31/12/2030 | | Medium (1352) | Low(165) | |
| Tarragona – Castellbisbal – Barcelona | 47 | MED | ES | Freight | 81.8 | 31/12/2020 | | No Traffic Data | No Traffic Data | The total length of the section is 106 and the rest of the line is under construction |
| Madrid – Casetas – Zaragoza – Tarragona | 46 | MED | ES | Freight | 536.7 | 31/12/2030 | | Medium (6117) | Medium (13733) | |
| Cartagena – Murcia | 43 | MED | ES | Passenger and freight | 61.0 | 31/12/2030 | | No Traffic Data | No Traffic Data | |
| Algeciras – Antequera (Bobadilla) | 43 | MED – ATL | ES | Passenger and freight | 177.0 | 31/12/2030 | | Low(754) | Low(3918) | |
| Córdoba – Linares – Madrid | 41 | MED – ATL | ES | Freight | 459.1 | 31/12/2030 | | Medium (5843) | Medium (12507) | |

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Granada – Murcia | 40 | MED | ES | Passenger and freight | 351.6 | 31/12/2030 | | Low(190) | Low(744) | |
| Sevilla – Antequera (Bobadilla) | 37 | MED | ES | Passenger and freight | 159.4 | 31/12/2030 | | Low(184) | Medium (16742) | |
| Madrid – La Sagra – Cáceres | 30 | ATL | ES | Passenger and freight | 605.7 | 31/12/2030 | X | Low(45) | Low(9962) | |
| **Total Length not expected in the short (km)** | | | | | **4063.5** | | | | | |
| **Total gaps priority (km)** | | | | | **624.4** | | | | | |

### *5.24.1 **Sketch with the priority gaps***






### *5.24.2* ***Priority gaps***

#### ***Medina del Campo – Border ES/PT (Aveiro)***

The Medina del Campo – Border ES/PT (Aveiro) line belongs to the ATL Corridor. This section should be selected as a priority gap because it connects Spain and Portugal. Furthermore, the Portuguese side of the cross-border section already deploys ETCS.

#### ***Burgos - Vitoria (High speed)***

The Burgos - Vitoria high speed line belongs to the ATL Corridor. This section connects Vitoria with the French border and the line Madrid – Burgos, which is already equipped with ETCS in operation. For this reason, this section should be selected as a priority gap.

#### ***Córdoba - La Sagra – Madrid***

There are two lines In the Mediterranean and Atlantic Corridors connecting Madrid and Córdoba: the high-speed line for passenger traffic and the conventional line for freight traffic.

The high-speed line should be selected as a priority gap because it connects sections already equipped with ETCS in operation: Granada – Córdoba and the section connecting the capital city of the country, Madrid, with the French border. For this reason, this line should be selected as a priority gap.

#### ***Bilbao - Puerto de Bilbao***

The Bilbao - Puerto de Bilbao line belongs to the ATL Corridor. This line should be selected as a priority gap because it connects the Bilbao port with the cross-border section to France.

### *5.24.3* ***Gaps discarded***

This section describes the lines which have a high score according to the methodology explained in Section 3 that are however rejected for the reasons stated below.

***Bergara - Irún (Border ES/FR)***

There are two lines in the Atlantic Corridor connecting Spain and France: one is dedicated to passenger traffic, newly built and funded by the CEF project 2015-ES-TM-0118-W, and the other is an existing line dedicated to freight traffic but with mixed operations.

According to the criteria explained in Section 4, this line could be selected as a priority gap but it is ultimately discarded because the French side of the cross-border section does not have any ETCS deployment activity and has not been selected as a priority gap either.

### *5.25* ***Sweden***

Sweden does not have any line with ETCS in operation, under construction or funded, probably because this country does not have the obligation of fitting ETCS on any line before 2023.

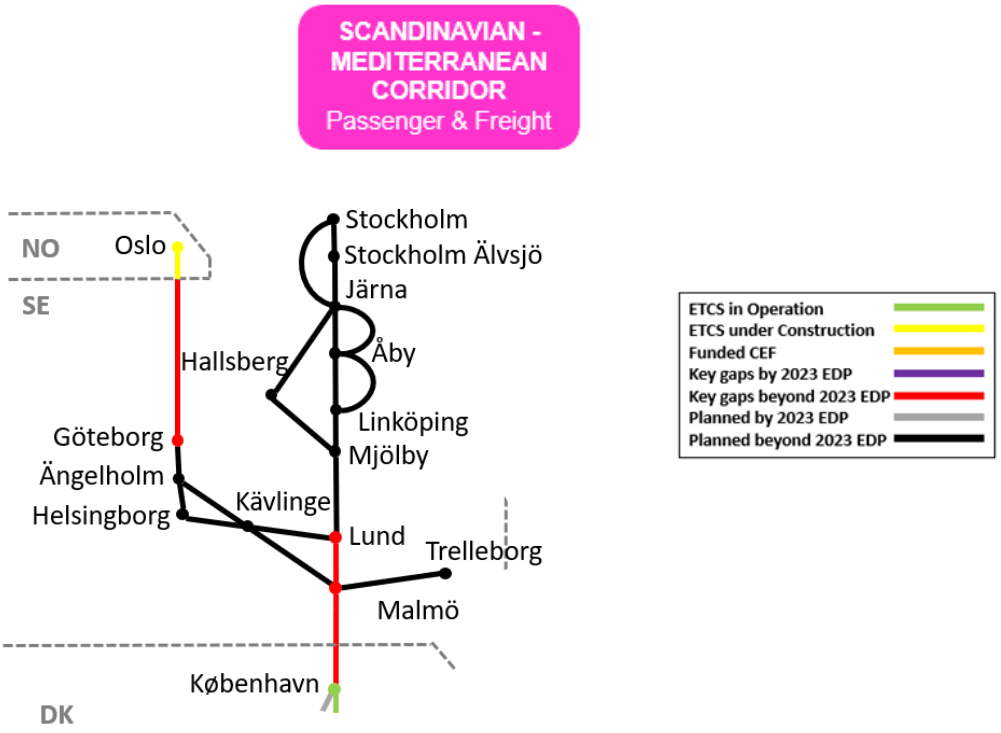
According to the EDP, this MS should equip 1,595 km of lines belonging to the CNC with ETCS. No gaps are closed in this proposal because Sweden has the ETCS deployment category of "No ETCS". However, 203 km may be selected as priority gaps for the reasons explained below.

The following table shows all the identified gaps in Sweden, i.e. lines that are not in operation, under construction or funded with a CEF project in the CNC. According to the criteria and methodology explained in Section 4, gaps are listed from the highest to the lowest priority gaps. Lines highlighted in blue are the gaps to be prioritised in Sweden.

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Lund - Malmö | 68 | SCM | SE | Passenger and freight | 15.1 | 31/12/2024 | | High(16801) | High(136007) | |
| Border NO/SE (Kornsjø) - Göteborg | 66 | SCM | SE | Passenger and freight | 176.7 | 31/12/2027 | X | Medium (6030) | Low(22726) | |
| Malmö - Border SE/DK (Malmö) | 64 | SCM | SE | Passenger | 11.6 | 31/12/2023 | X | Low(0) | High(120587) | |
| Malmö - Trelleborg | 53 | SCM | SE | Passenger and freight | 34.7 | 31/12/2027 | | Medium (7494) | Low(33406) | |
| Åby - Linköping - Mjölby | 51 | SCM | SE | Freight | 85.3 | 31/12/2024 | | Medium (8391) | Low(22035) | |
| Stockholm Älvsjo - Järna | 49 | SCM | SE | Freight | 41.1 | 31/12/2025 | | Medium (5631) | Low(0) | |
| Mjölby - Malmö | 46 | SCM | SE | Passenger and freight | 339.4 | 31/12/2025 | | Medium (13894) | Low(17222) | |
| Stockholm - Stockholm Älvsjo | 46 | SCM | SE | Freight | 9.7 | 31/12/2025 | | Low(1030) | Low(0) | |
| Ängelholm - Helsinborg - Kävlinge - Lund | 44 | SCM | SE | Passenger | 78.7 | 31/12/2027 | | Low(73) | Low(41400) | |
| Järna - Hallsberg - Mjölby | 43 | SCM | SE | Passenger and freight | 242.0 | 31/12/2024 | | Medium (7443) | Low(0) | |
| Järna - Åby | 41 | SCM | SE | Freight | 105.8 | 31/12/2025 | | Low(363) | Low(0) | |

| Line | % | CNC | MS | Freight / Passenger | Length (Km) | MS planned finish date | c-b | Freight Traffic (per Km) [trains/year] | Passenger Traffic (per Km) [trains/year] | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| Göteborg - Ängelholm - Kävinge - Burlöv | 41 | SCM | SE | Passenger and freight | 277.6 | 31/12/2027 | | Medium (5733) | Low(16529) | |
| Stockholm - Järna - Åby - Linköping | 33 | SCM | SE | Passenger | 177.8 | 31/12/2028 | | Low(0) | Low(31851) | |
| **Total Length not expected in the short (km))** | | | | | **1.595.5** | | | | | |
| **Total gaps priority (km)** | | | | | **203.4** | | | | | |

*5.25.1* ***Sketch with the priority gaps***




*5.25.2* ***Priority gaps***

***Lund – Malmö***

The Lund – Malmö line belongs to the SCM Corridor. From all the lines belonging to CNC in Sweden, this section is the busiest in passenger and freight traffic, which is why it should be selected as a priority gap.

***Border NO/SE (Kornsjø) – Göteborg***

The Border NO/SE (Kornsjø) – Göteborg line belongs to the SCM Corridor. This section should be selected as a priority gap because it connects Norway with Sweden and because the Norwegian side of the cross-border section already deploys ETCS.

***Malmö - Border SE/DK (Malmö)***

The Malmö - Border SE/DK (Malmö) line belongs to the SCM Corridor. This section should be selected as a priority gap because it connects Denmark with Sweden and because the Danish side of the cross-border section has also been selected as a priority gap.

### *5.26 **Comparison of the length of priority gaps per Member State***

The following table includes information on the classification of the ETCS deployment status per MS by considering the categories described in Section 3. The total length of the CNC per MS, the total length of the gaps and the length of the gaps prioritised are also provided.

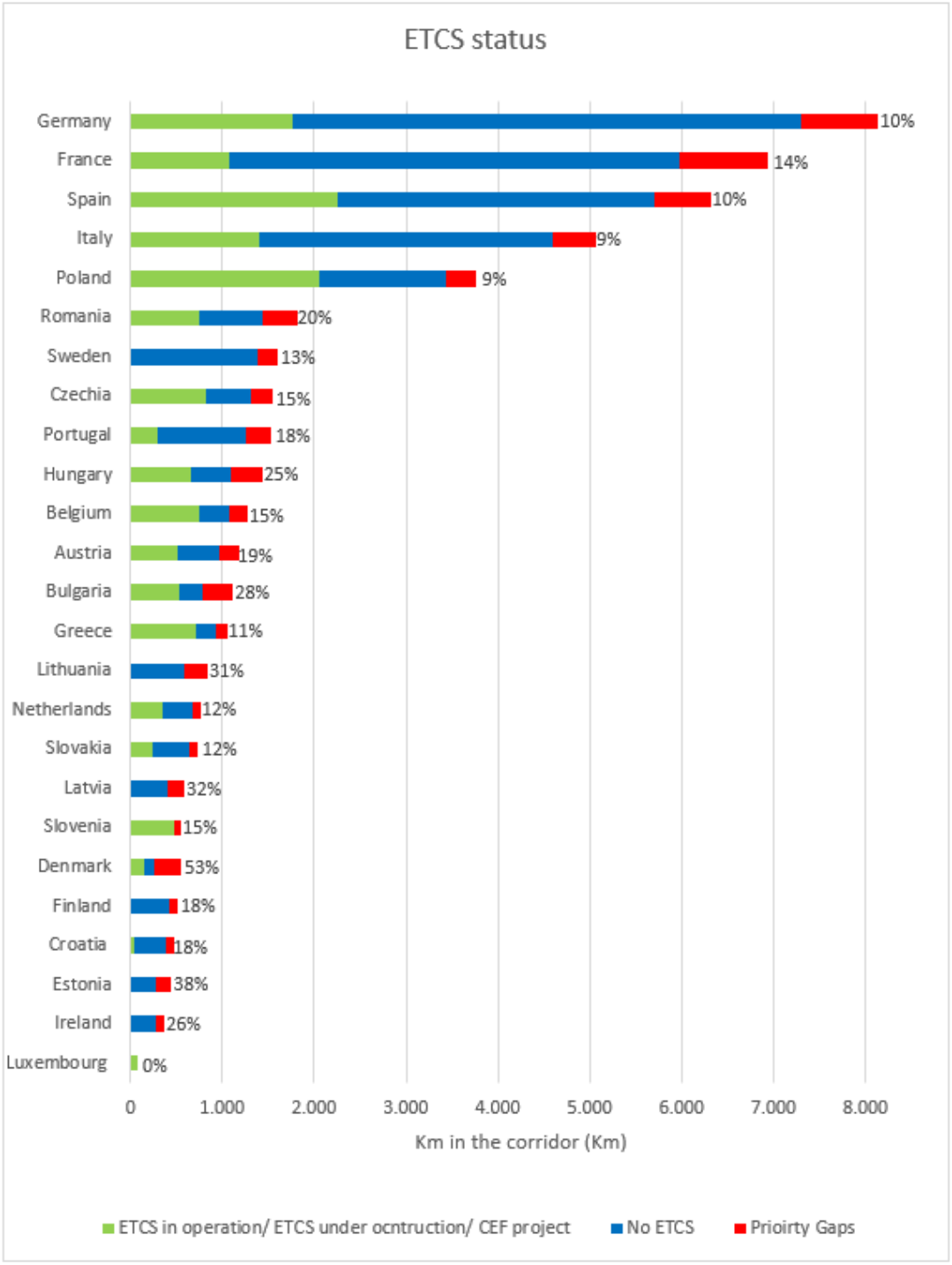
| Member State [1] | Current ETCS deployment by considering only the CNC | ETCS deployment by considering the priority gaps as under construction in CNC | CNC length per MS (km) | CNC gaps per MS (km) | Priority gaps per MS (km) | Priority gaps vs CNC length per MS (%) | Priority gaps vs CNC gaps per MS (%) |
|---|---|---|---|---|---|---|---|
| Austria | ETCS Islands (BAC) / ETCS network with gaps (RDN) / without gaps (OEM & SCM) | ETCS Islands (BAC) / ETCS network with gaps (RDN) / without gaps (OEM & SCM) | 1,181.6 | 677.0 | 219.2 | 19% | 32% |
| Belgium | ETCS network with gaps | ETCS network with gaps | 1,280.6 | 536.6 | 198.1 | 15% | 37% |
| Bulgaria | ETCS Islands | ETCS network with gaps | 1,106.7 | 581.7 | 313.8 | 28% | 54% |
| Croatia | ETCS Islands | ETCS network with gaps | 469.2 | 428.6 | 86.6 | 18% | 20% |
| Czechia | ETCS Islands (OEM & RDN) / ETCS network with gaps (BAC) | ETCS network with gaps | 1,545.1 | 724.4 | 235.6 | 15% | 33% |
| Denmark | ETCS Islands | ETCS network with gaps | 548.7 | 404.8 | 291.1 | 53% | 72% |
| Estonia | No ETCS | ETCS network with gaps | 441.7 | 441.7 | 166.6 | 38% | 38% |
| Finland | No ETCS | ETCS Islands | 509.5 | 509.5 | 90.4 | 18% | 18% |
| France | ETCS Islands | ETCS Islands | 6,938.4 | 5,857.4 | 973.0 | 14% | 17% |
| Germany | ETCS Islands (NSB, OEM, RDN, SCM)/ ETCS network with gaps (ATL, RALP) | Islands (NSB, OEM, RDN, SCM)/ ETCS network with gaps (ATL, RALP) | 8,137.6 | 6372.5 | 843.9 | 10% | 13% |
| Greece | ETCS network with gaps | ETCS network with gaps | 1,057.2 | 336.2 | 121.2 | 11% | 36% |
| Hungary | ETCS network with gaps | ETCS network with gaps | 1,442.9 | 788.3 | 357.5 | 25% | 45% |
| Ireland | No ETCS | ETCS network with gaps | 369.2 | 369.3 | 95.4 | 26% | 26% |
| Italy | ETCS Islands (BAC, MED & SCM)/ ETCS network with gaps (RALP) | ETCS Islands (BAC, MED & SCM)/ ETCS network with gaps (RALP) | 5,063.9 | 3,655.7 | 469.4 | 9% | 13% |
| Latvia | No ETCS | ETCS network with gaps | 593.8 | 593.8 | 189.4 | 32% | 32% |
| Lithuania | No ETCS | ETCS network with gaps | 848.4 | 848.4 | 262.9 | 31% | 31% |

[1] Malta and Cyprus have no railway lines belonging to any CNC

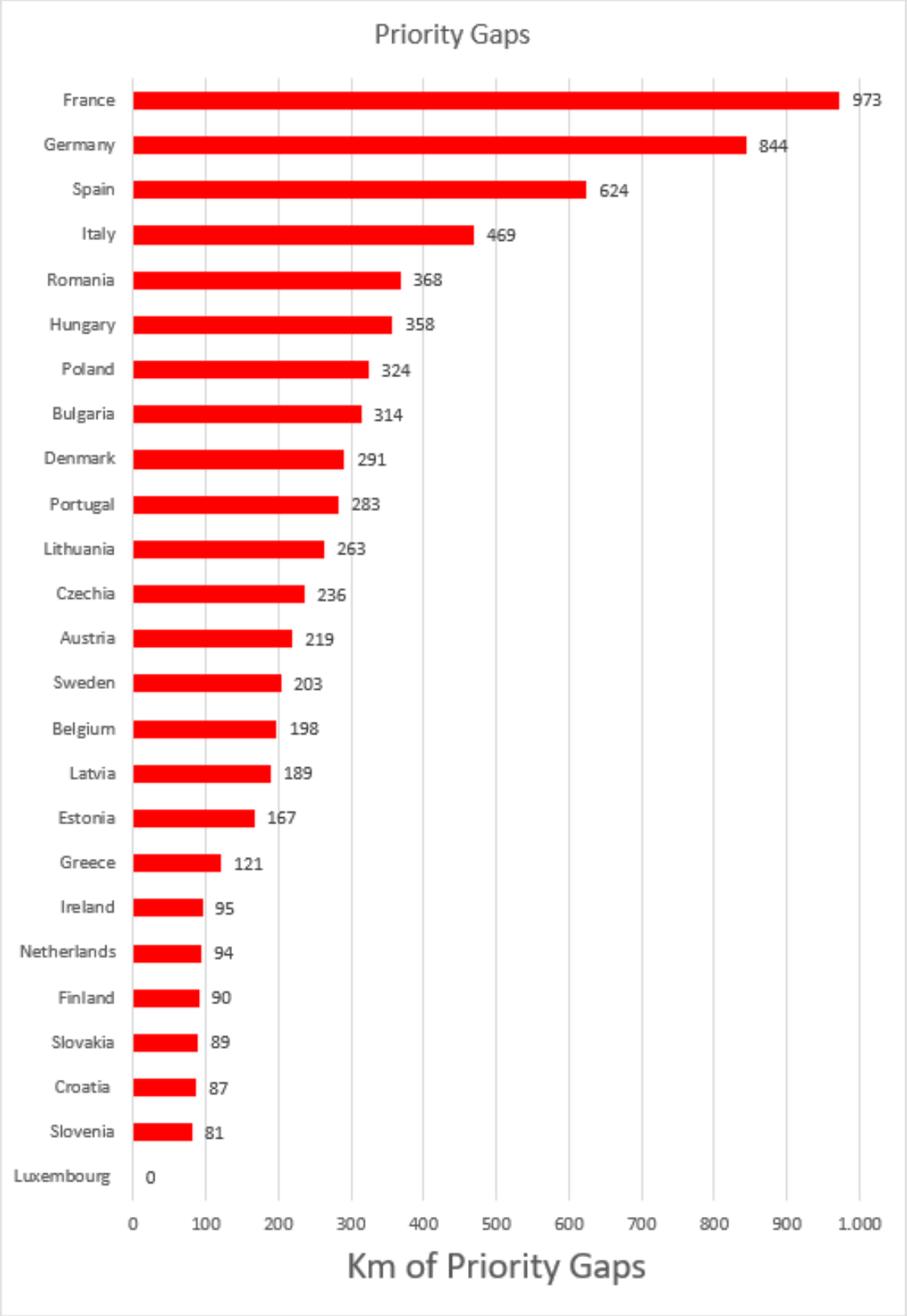
| Member State [1] | Current ETCS deployment by considering only the CNC | ETCS deployment by considering the priority gaps as under construction in CNC | CNC length per MS (km) | CNC gaps per MS (km) | Priority gaps per MS (km) | Priority gaps vs CNC length per MS (%) | Priority gaps vs CNC gaps per MS (%) |
|---|---|---|---|---|---|---|---|
| Luxembourg | ETCS network without gaps | ETCS network without gaps | 85.7 | 0.0 | 0.0 | 0% | 0% |
| Netherlands | ETCS Islands (NSB) / ETCS network with gaps (RALP & NSM) | ETCS network with gaps | 769.9 | 412.8 | 94.0 | 12% | 23% |
| Poland | ETCS Islands (BAC) / ETCS network with gaps (NSB) | ETCS Islands (BAC) / ETCS network with gaps (NSB) | 3,761.7 | 1,713.2 | 324.4 | 9% | 19% |
| Portugal | ETCS Islands | ETCS Islands | 1,534.1 | 1,245.7 | 282.9 | 18% | 23% |
| Romania | ETCS Islands | ETCS Islands (OEM) / ETCS network with gaps (RDN) | 1,812.3 | 1,063.6 | 368.1 | 20% | 35% |
| Slovakia | ETCS Islands | ETCS network with gaps | 729.4 | 496.7 | 89.2 | 12% | 18% |
| Slovenia | ETCS network with gaps | ETCS network without gaps | 555.8 | 80.8 | 80.8 | 15% | 100% |
| Spain | ETCS Islands | ETCS Islands | 6,319.9 | 4,063.5 | 624.4 | 10% | 15% |
| Sweden | No ETCS | ETCS Islands | 1,595.5 | 1,595.5 | 203.4 | 13% | 13% |
| **Total** | | | **48,699.3** [2] | **33,797.65** | **6,981.30** | **14%** | **21%** |

[2] This figure includes only the length of the CNC in the EU Member States so the length of the CNC in Norway, Switzerland and the United Kingdom are not included.

The following figure shows the ETCS deployment status per Member State and provides the length of sections where ETCS is expected to be under construction or in operation in the short term (green), the length of not prioritised gaps (blue) and the length of prioritised gaps (red). The percentage represents the total length of prioritised gaps over the total length of CNC lines per MS.



The following figure shows the total length of prioritised gaps per Member State.



# 6. CONCLUSIONS

The ETCS deployment plan on rail lines included in any of the CNC was analysed per EU Member State. This report contains the list of lines and sections with ETCS not expected to be under construction or in operation in the short term and those that have been found to be of most interest according to the methodology and criteria defined in this study. The total length of CNC gaps in EU Member States is 33,797 km and 21 % of it (6,981 km) is considered as of prime importance. The analysis undertaken show 4 clear trends regarding the analysis of the level of relevance of the gaps in ETCS deployment in different countries.

- "No ETCS" category includes Member States where no CNC sections are expected to be "ETCS under construction" or "in operation" in the short term.
- The results of the gaps prioritisation in Member States included in this category are the lines that connect cross-borders sections with the first node by considering the traffic flow.

- "ETCS islands" category includes Member States where ETCS deployment focuses on specific areas called islands but exclude most of the corridors, i.e. there are large gaps in the Member States network.
- The results of the gap prioritisation in Member States included in this category are different depending on the total length of the gaps.
- The results for Member States with more than 1,000 km in gaps are often lines that connect cross-border sections with the first node or the current ETCS island but also internal lines with high traffic volumes running through existing ETCS islands.
- The results for Member States with less than 1,000 km in gaps are gaps that connect the ETCS islands with high traffic flows. In most of the cases, these Member States will belong to the "ETCS network with gaps" category after implementing the prioritised gaps.

- "ETCS network with gaps" category includes Member States with an ETCS deployment where there is a limited number of gaps.
- The results of the gap prioritisation in Member States included in this category are the gaps located next to cross-border sections and those with higher traffic flow. Only Slovenia will change to the ETCS network without gap category after implementing the prioritised gaps.

- "ETCS network without gaps" category includes Member States that do not have ETCS gaps in the CNC. Therefore, no prioritisation of gaps applies. Luxembourg is the only country in this category.

Given that the analysis is based on traffic flow data and ERTMS high-level deployment status and plans, the results have inherent limitations and should be viewed with caution before making deployment decisions. The following criteria should be considered additionally to reevaluate the lines to be prioritised.

- Other TEN parameters, such as, electrification, line speed, track gauge, etc. have not been considered but they can be relevant to the final selection of priority lines. For example, lines non-electrified or with a low line speed could be prioritised in this document.

- Sections located next to cross-border sections prioritised in the applied methodology, connect the border crossing point with the first node indicated in the CNC schemes included in the EDP [3]. The relevance of this "first node" (i.e.

international trains start or end the trip in this node) has not been confirmed. Therefore, from an operator's point of view, the cross-border sections to be prioritised could be longer or shorter than the proposed one.

- The methodology is focused on closing gaps with high traffic volumes. Splitting a gap into several sections by considering relevant nodes located into the gap is not foreseen by the methodology. This means that with similar traffic volume, closing a gap has higher priority than equipping a short section that connects an equipped line with a relevant hub located in a longer gap.

- The length of the gap is the only criterion considered by the methodology to prioritise gaps related to the cost of equipping a gap. The technical complexity of equipping a line or a station with ERTMS is not considered. Signal Equivalent Units in the gaps should be considered to refine prioritisation. However, without performing interviews or other measures to retrieve specific information of each project, an estimation of project costs is not possible.

- There are some CNC sections without traffic flow information available in the Dataset of the Rail Traffic data elaborated by the CNC contractors' team [2]. Sections with actual high traffic volumes but without traffic flow information available are penalised in the methodology.

- ETCS deployment information on sections reported by the Member State is used to identify the CNC gaps. However, detailed status of ETCS deployment in station tracks crossed by different lines with different ETCS deployment status is a specific information that is not available. For example, in the case of a station with some tracks equipped with ETCS that allow ETCS trains to cross the station (e.g. by-pass tracks or tracks without a platform), this station is not considered as a gap. However, if the equipped tracks do not allow ETCS trains to stop in the station, they should be considered as a gap.

# ANNEX A: ETCS STATUS IN THE CORE NETWORK CORRIDORS

This Annex includes the ETCS status of the lines in each country that belong to the Core Network Corridors (i.e. EU Member States plus Norway, Switzerland and the United Kingdom).

Lines that are already in operation, under construction and those lines that are not in operation or under construction, but they are funded with a CEF project in CNC and are expected to be under construction in a short term are identified per country in this section.

In the tables included in this annex, the column "Project Code" includes the CEF project when a line is funded.

## 1. AUSTRIA

### 1.1 *Lines in operation*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Comments |
|---|---|---|---|---|---|
| Innsbruck - Border AT/IT (Brennero) | SCM | AT | Passenger and freight | 13.6 | |
| St. Pölten - Wien | RDN | AT | Passenger and freight | 56.4 | |
| Border AT/CZ - Wien | BAC – OEM | AT | Passenger and freight | 81.6 | |
| Border DE/AT (Kufstein) - Innsbruck | SCM | AT | Passenger and freight | 62.6 | |
| Border DE/AT (Passau/Ingling) - Wels | RDN | AT | Passenger and freight | 79.3 | This line is in operation with ETCS L1 and is planned to migrate to ETCS L2 according to the NIP |

### 1.2 *Lines under construction*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Border DE/AT (Freilassing/Salzburg) - Salzburg - Wels | RDN | AT | Passenger and freight | 104.0 | 2005-AT-90103-P | 31/12/2030 | |
| Wien - Border AT/HU (Nickelsdorf) | BAC - OEM - RDN | AT | Passenger and freight | 63.6 | | 31/12/2022 | ETCS L1 is equipped with PreBaseline 2, this line is planned to be equipped with ETCS L2 and Baseline 2 |
| Gross Sierning (Knoten Rohr) - Knoten Wagram | RDN | AT | Passenger | 17.2 | | 31/12/2030 | Of the 17,154 km of this line, 2,878 km are already with ETCS in operation. |
| Wels - Linz | RDN | AT | Passenger and freight | 26.4 | | 31/12/2022 | |

### 1.3 *Funded lines*

Austria has been assigned these CEF projects 2009-AT-60148-P, 2007-AT-60450-P and 2005-AT-90103-P. The lines that are associated with these projects are already under construction or in operation.

# 2. BELGIUM

## 2.1 *Lines in operation*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Comments |
|---|---|---|---|---|---|
| Aarschot - Antwerpen | NSB - NSM | BE | Freight | 2.5 | Of the 43,702 km of this line, 24 km are funded by the Project 2018-BE-TM-0101-W and the rest are without ETCS activity |
| Antwerpen - Border BE/NL (Galder) | NSB - RALP - NSM | BE | Passenger | 40.1 | |
| Antwerpen - Lierre | RALP | BE | Unselected | 15.2 | |
| Antwerpen - Noorderdokken | RALP - NSM | BE | Freight | 4.3 | |
| Antwerpen port | RALP - NSM | BE | Freight | 8.6 | The total length of this line is 23,938. 15,380 km of this length has an ETCS status as No ETCS |
| Bruxelles/Brussel (Zaventem) | NSB - NSM | BE | Passenger | 11.1 | |
| Chênée - Border BE/DE (Hergenrath/Bundesgrenze) | NSB - RALP | BE | Passenger | 37.9 | |
| Chênée - Liege - Leuven | NSB - RALP | BE | Passenger | 78.3 | |
| Leuven - Bruxelles/Brussel | NSB | BE | Passenger | 0,.9 | |
| Leuven - Ottignies - Namur - Border BE/LU (Bettembourg) | NSM | BE | Freight | 249.6 | |
| Namur - Cigney - Border BE/LU (Luxembourg) | NSM | BE | Passenger | 6.5 | The total length of this line is 146,287 km, only 6,530km are already in operation, the rest of the line has an ETCS status as No ETCS |
| Nekkerspoel - Antwerpen | NSB - RALP - NSM | BE | Passenger | 21.9 | |
| Ottignies - Namur | NSM | BE | Passenger | 30.6 | |
| Schaerbeek - Mechelen | NSB - NSM | BE | Passenger | 19.1 | |
| Zaventem - Leuven | NSB - RALP | BE | Passenger | 17.1 | |

## 2.2 *Lines under construction*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Gent - Bruxelles/Brussels | RALP | BE | Passenger | 32.9 | | 31/12/2022 | The total length of this line is 49,428 km. 16,56 km have an ETCS status as No ETCS and have no associated CEF projects. |

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Bruxelles/Brussels - Zaventem | RALP – NSM – NSB | BE | Passenger | 8.5 | | 31/12/2022 | The total length of this line is 10,826 km. 2,28 km have an ETCS status as No ETCS and have no associated CEF projects. In the NSB and NSM corridor this line is the Schaerbeek - Bruxelles |

## 2.3 ***Funded lines***

The following table describes the CEF funded projects related to deployment of ERTMS lines that are expected to be under construction in a short term in this country.

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Aarschot - Antwerpen | NSB - NSM | BE | Freight | 23.7 | 2018-BE-TM-0101-W | 31/12/2023 | Of the 43,702 km of this line, 2,5 km are already in operation Only 24 km are funded by the Project 2018-BE-TM-0101-W |
| Aarschot - Leuven | NSM | BE | Freight | 13.8 | 2018-BE-TM-0101-W | 31/12/2023 | |
| Zeebruge - Brugge - Gent | RALP - NSM | BE | Passenger and freight | 40.7 | 2018-BE-TM-0101-W | 31/12/2023 | The total length of this line is 57,995 and the rest are without ETCS |
| Noorderdokken - Border BE/NL (Essen/Roosendaal) | NSB - NSM | BE | Passenger and freight | 20.6 | 2016-BE-TM-0298-W | 31/12/2020 | The total length of this line is 24,051 km and the rest are without ETCS |
| Namur - Cigney - Border BE/LU (Luxembourg) | NSM | BE | Passenger | 51.9 | 2016-BE-TM-0298-W | 31/12/2022 | The total length of this line is 146,287 km. 87,88 km have an ETCS status as No ETCS and have no associated CEF projects. 6,530 km of this line are already in operation |
| Gent - Antwerpen | RALP - NSM | BE | Freight | 8.4 | 2018-BE-TM-0101-W | 31/12/2023 | The total length of the line is 51,457 km and the rest are without ETCS |

# 3. BULGARIA

## 3.1 *Lines in operation*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Comments |
|---|---|---|---|---|---|
| Septemvri - Plovdiv | OEM | BG | Passenger and freight | 56.2 | |
| Plovdiv – Svilengrad (border BG/TR) | OEM | BG | Passenger and freight | 157.8 | |
| Border RO/BG (New Europe Brid) - Vidin | OEM | BG | Passenger and freight | 12.0 | |

## 3.2 *Lines under construction*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Plovdiv-Mihaylovo - Burgas | OEM | BG | Passenger and freight | 299.2 | 2016-BG-TMC-0047-M | 31/12/2024 | Only section between Plovdiv -Skutare (15 km) is funded |

## 3.3 *Funded lines*

Bulgaria has assigned CEF project 2007-AT-60450-P. The line that is associated with this project is already operation.

# 4. CROATIA

## 4.1 *Lines in operation*

There are no sections with ETCS in operation in the CNC in Croatia. According to the EDP, Croatia only has lines planned to be in operation beyond 2023.

## 4.2 *Lines under construction*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Dugo Selo - Border HR/HU (Botovo) | MED | HR | Passenger and freight | 39.1 | | 31/12/2023 | The total length of this line is 79,07 km, the rest of the line is without ETCS activity. This section is Dugo Selo - Krizevci |

## 4.3 *Funded lines*

Croatia does not have any CEF project.

# 5. CZECHIA

## 5.1 *Lines in operation*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Comments |
|---|---|---|---|---|---|
| Kolín - Břeclav - Border CZ/SK (Lanzhot) | BAC - OEM | CZ | Passenger and freight | 267.2 | |

## 5.2 *Lines under construction*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Bohumin - Ostrava - Prerov - Breclav | BAC | CZ | Passenger and freight | 189.6 | 2014-CZ-TMC-0308-M | 31/12/2020 | |
| Bohumin - Border PL/CZ (Zebrzydowice) | BAC | CZ | Passenger and freight | 17.3 | 2014-CZ-TMC-0308-M | 31/12/2020 | |
| Praha - Kolín | OEM - RDN | CZ | Passenger | 58.3 | 2015-CZ-TM-0238-M | 31/12/2022 | |
| Plzeň - Beroun | RDN | CZ | Passenger and freight | 73.5 | 2015-CZ-TM-0174-M | 31/12/2022 | |
| Česká Třebová - Přerov | OEM - RDN | CZ | Passenger and freight | 102.2 | 2015-CZ-TM-0377-M | 31/12/2021 | |
| Cheb - Plzeň | RDN | CZ | Passenger and freight | 102.2 | 2015-CZ-TM-0174-M | 31/12/2021 | |
| Border DE/CZ (Schirding/Cheb) - Cheb | RDN | CZ | Passenger and freight | 10.1 | | 31/12/2022 | |

## 5.3 *Funded lines*

Czechia has been assigned CEF Projects 2014-CZ-TMC-0308-M, 2015-CZ-TM-0238-M, 2015-CZ-TM-0174-M and 2015-CZ-TM-0377-M. The lines that are associated with these projects are already under construction.

# 6. DENMARK

## 6.1 *Lines in operation*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Comments |
|---|---|---|---|---|---|
| København - Ringsted | SCM | DK | Passenger | 61.2 | |

## 6.2 *Lines under construction*

No lines in Denmark are under construction in the CNC.

## 6.3 *Funded lines*

The following table describes the CEF funded projects related to deployment of ERTMS lines that are expected to be under construction in a short term in this country.

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Ringsted - Nykøbing | SCM | DK | Passenger and freight | 82.7 | 2017-DK-TM-0008-W | 31/12/2024 | |

# 7. ESTONIA

There are no sections with ETCS in operation, under construction or funded CEF Projects in the CNC in Estonia. According to the EDP, Estonia only has lines planned to be put in operation beyond 2023.

# 8. FINLAND

There are no sections with ETCS in operation, under construction or funded CEF Projects in the CNC in Finland. According to the EDP, The Finland ETCS deployment is expected to be completed beyond 2023.

# 9. FRANCE

## 9.1 *Lines in operation*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Comments |
|---|---|---|---|---|---|
| Bordeaux - Monts | ATL | FR | Passenger | 308.0 | |
| Border ES/FR (Perthus tunnel) - Perpignan | MED | FR | Passenger | 31.1 | |
| Border LU/FR (Dudelange) - Thionville | NSM | FR | Passenger and freight | 14.9 | |
| Montpellier - Nîmes | MED | FR | Passenger | 0 | |
| Paris - Reims - Rémilly | ATL | FR | Passenger | 292.6 | |
| Rémilly - Strasbourg | ATL - NSM | FR | Freight | 113.2 | The total length of this line is 236 km. 123 km of this length are under construction. |

## 9.2 *Lines under construction*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Strasbourg - Mulhouse - Border FR/CH (Basel) | NSM | FR | Passenger and freight | 138.9 | 2014-FR-TM-0545-W | 31/12/2025 | |
| Metz - Rémilly | ATL - NSM | FR | Passenger and freight | 28.1 | 2014-FR-TM-0545-W | 31/12/2025 | |
| Rémilly - Strasbourg | ATL - NSM | FR | Freight | 122.9 | 2014-FR-TM-0545-W | 31/12/2025 | The total length of this line is 236km. 113 km of this length are already in operation. |
| Thionville - Metz | NSM | FR | Passenger and freight | 31.4 | 2014-FR-TM-0545-W | 31/12/2022 | |

## 9.3 *Funded lines*

Nowadays, France does not have any active CEF project.

# 10. GERMANY

## 10.1 *Lines in operation*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Comments |
|---|---|---|---|---|---|
| Erfurt | SCM | DE | Passenger and freight | 9.9 | |
| Erfurt - Ebensfeld - Nürnberg (Fuerth) | SCM | DE | Germany | 115.8 | |
| Halle - Erfurt | SCM | DE | Passenger | 80.0 | |
| German border (NL/DE) - Duisburg | RALP | DE | Passenger and freight | 77.4 | |

## 10.2 *Lines under construction*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Aachen - Border DE/BE (Botzelaer) | NSB - RALP | DE | Freight | 6.3 | 2015-DE-TM-0363-W | 31/12/2024 | ETCS Level 1 LS |
| Appenweier - Karlsruhe | RALP - RDN | DE | Passenger and freight | 63.5 | 2014-DE-TM-0057-W | 31/12/2022 | |
| Berlin - Bitterfeld | SCM | DE | Passenger and freight | 108.6 | VDE 8 (German Unity Transport Project 8) | 31/12/2023 | The total length of this line is 126 km, the rest of the line is without ETCS activity |
| Bitterfeld - Leipzig | OEM - SCM | DE | Passenger and freight | 15.1 | VDE 8 (German Unity Transport Project 8) | 31/12/2023 | The total length of this line is 29 km, the rest of the line is without ETCS activity |
| Bitterfield - Halle | SCM | DE | Passenger and freight | 31.9 | VDE 8 (German Unity Transport Project 8) | 31/12/2023 | |
| Border DK/DE (Padborg) - Flensburg Weiche | SCM | DE | Passenger and freight | 6.1 | 2015-DE-TM-0363-W | 31/12/2023 | ETCS Level 1 LS |
| Border FR/DE (Bundergrenze) - Mannheim | ATL | DE | Passenger and freight | 136.3 | 2015-DE-TM-0363-W 2014-DE-TM-0057-W | 31/12/2023 | ETCS Level 1 LS |
| Border PL/DE (Bundesgrenze/Oderbruecke) - Frankfurt/Oder | NSB | DE | Passenger and freight | 4.8 | 2015-DE-TM-0363-W | 31/12/2023 | ETCS Level 1 LS |
| Darmstadt - Mannheim | RALP - RDN | DE | Freight | 54.2 | | 31/12/2023 | |
| Duisburg-Opladen | RALP | DE | Freight | 49.3 | | 31/12/2025 | ETCS Level 1 LS |
| Düsseldorf - Köln | RALP | DE | Freight | 14.4 | | 31/12/2023 | ETCS Level 1 LS |
| Düsseldorf - Opladen | RALP | DE | Freight | 6.2 | | 31/12/2025 | |
| Erfurt - Ebensfeld - Nürnberg (Fuerth) | SCM | DE | Passenger | 61.9 | VDE 8 (German Unity Transport Project 8) | 31/12/2030 | |
| Frankfurt/Oder - Erkner | NSB | DE | Passenger and freight | 56.2 | 2015-DE-TM-0363-W | 31/12/2023 | |
| Hockenheim - Karlsruh | RALP - RDN | DE | Passenger | 35.4 | | 31/12/2025 | |

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Karlsruhe - Appenweier - Border DE/CH (Basel) | RALP | DE | Passenger | 56.2 | 2014-DE-TM-0057-W | 31/12/2023 | |
| Karlsruhe - Appenweier - Kenzingen | RALP | DE | Passenger and freight | 42.1 | | 31/12/2022 | |
| Koblenz - Bingen - Mainz | RALP | DE | Passenger | 89.8 | 2014-DE-TM-0057-W | 31/12/2025 | |
| Köln | NSB - RALP | DE | Freight | 14.9 | | | The total length of the line is 27 km, the rest of the line is without ETCS activity |
| Köln - Aachen | NSB - RALP | DE | Passenger and freight | 4.3 | | 31/12/2025 | |
| Köln - Rolandseck - Koblenz | RALP | DE | Passenger and freight | 88.0 | 2014-DE-TM-0057-W | 31/12/2025 | |
| Köln - Troisdorf | RALP | DE | Passenger | 12.2 | | 31/12/2025 | |
| Kostheim - Mainz - Mainz-Bischofsheim | RALP | DE | Freight | 14.0 | | 31/12/2023 | ETCS Level 1 LS |
| Kostheim - Neuwied | RALP | DE | Freight | 85.7 | | 31/12/2028 | ETCS Level 1 LS |
| Mainz - Mainz-Bischofsheim | RALP | DE | Passenger | 9.6 | | 31/12/2025 | |
| Mainz-Bischofsheim - Gross Gerau - Darmstadt | RALP | DE | Freight | 23.8 | | 31/12/2025 | ETCS Level 1 LS |
| Mannheim - Schwetzingen - Hockenheim | RALP | DE | Freight | 18.9 | | 31/12/2023 | |
| Mulheim - Border DE/CH (Basel) | RALP | DE | Passenger and freight | 24.4 | 2014-DE-TM-0057-W | 31/12/2022 | |
| Nassenheide - Berlin | OEM - SCM | DE | Passenger and freight | 27.2 | | 31/12/2023 | The total length of this line is 43 km, the rest of the lines is without ETCS activity |
| Opladen - Köln | NSB - RALP | DE | Passenger and freight | 11.2 | | 31/12/2025 | |
| Rostock - Nassenheide | OEM - SCM | DE | Passenger and freight | 167.9 | | 31/12/2023 | |
| Stuttgart - Ulm | RDN | DE | Freight | 85.9 | | 31/12/2022 | |
| Troisdorf - Neuwied | RALP | DE | Freight | 95.0 | | 31/12/2028 | ETCS Level 1 LS |

### 10.3 ***Funded lines***

The following table describes the CEF funded projects related to deployment of ERTMS lines that are expected to be under construction in a short term in this country.

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Aachen - Border DE/BE (Bundesgrenze/Hergenrath) | NSB - RALP | DE | Passenger | 6.3 | 2015-DE-TM-0363-W | 31/12/2023 | |

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Schirding - Border DE/CZ (Schirding/Cheb) | RDN | DE | Passenger and freight | 1.7 | 2015-DE-TM-0363-W | 31/12/2023 | ETCS Level 1 LS |

## 11. GREECE

### 11.1 *Lines in operation*

There are no sections ETCS in operation in Greece in the CNC.

### 11.2 *Lines under construction*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Acharnes - Gefyres | OEM | EL | Passenger and freight | 1.9 | | 31/12/2020 | |
| Tithorea-Acharnes | OEM | EL | Passenger and freight | 157.1 | | 31/12/2020 | |
| Domokos - Tithorea | OEM | EL | Passenger and freight | 104.5 | 2014-EL-TMC-0651-W | 31/12/2023 | |
| Palaiofarsalos - Domokos | OEM | EL | Passenger and freight | 21.1 | | 31/12/2020 | |
| Border BG/EL (Kulata/Promachonas) - Thessaloniki - Palaiofarsalos | OEM | EL | Passenger and freight | 343.2 | | 31/12/2020 | |
| Kiato - Patra | OEM | EL | Passenger and freight | 93.3 | | 31/12/2030 | |

### 11.3 *Funded lines*

Greece has been assigned CEF project 2014-EL-TMC-0651-W. The line that is associated with this project is already under construction.

## 12. HUNGARY

### 12.1 *Lines in operation*

There are no sections ETCS in operation in Hungary in the CNC.

### 12.2 *Lines under construction*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Border SI/HU (Hodos) - Boba | MED | HU | Passenger and freight | 96.1 | | 31/12/2021 | 50,272 km of this line are now equipped with ETCS L1 PreBaseline, a migration to ETCS L2 and Baseline 2 is planned by 2021. |
| Budapest Ferencváros - Budapest Rákos | MED | HU | Passenger and freight | 9.8 | | 31/12/2020 | |
| Budapest Rákos - Hatvan | MED | HU | Freight | 57.7 | 2015-HU-TM-0158-M | 31/12/2022 | |

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Pusztaszabolcs - Budapest Kelenföld | MED | HU | Passenger and freight | 48.0 | 2015-HU-TM-0003-M | 31/12/2022 | The CEF project is associated with 42,879 km of the total length of the line |
| Székesfehérvár - Budapest Kelenföld | MED | HU | Passenger and freight | 58.3 | | 31/12/2021 | |
| Budapest node (Part 1) | MED - OEM - RDN | HU | Passenger and freight | 6.0 | | 20/05/2020 | This line is equipped with ETCS L1 PreBaseline and is planned to migrate a ETCS L2 and Baseline 2 |
| Budapest - Szajol | MED - OEM - RDN | HU | Passenger and freight | 104.0 | | 31/12/2021 | |
| Border HU/SK (Petrzalka/Rajka) - Hegyeshalom | OEM - RDN | HU | Passenger and freight | 17.3 | | 31/12/2024 | This line is equipped with ETCS L1 PreBaseline and is planned to migrate a ETCS L2 and Baseline 2 |
| Border AT/HU (Nickelsdorf) - Hegyeshalom | OEM - RDN | HU | Passenger and freight | 3.0 | | 31/12/2024 | |
| Hegyeshalom - Budapest | OEM - RDN | HU | Passenger and freight | 173.6 | | 31/12/2024 | This line is equipped with ETCS L1 PreBaseline and is planned to migrate a ETCS L2 and Baseline 2 |
| Szajol - Border RO/HU | OEM - RDN | HU | Passenger and freight | 83.9 | | 31/12/2021 | |

### 12.3 *Funded lines*

Hungary has been assigned CEF projects 2015-HU-TM-0158-M and 2015-HU-TM-0003-M. The lines that are associated with these CEF projects are already under construction.

## 13. IRELAND

There are no sections ETCS in operation, under construction or funded CEF Projects in the CNC in Ireland. According to the EDP, Ireland only has lines expected to be in operation beyond 2023.

## 14. ITALY

### 14.1 *Lines in operation*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Comments |
|---|---|---|---|---|---|
| Border CH/IT (Iselle) - Domodossola | RALP | IT | Passenger and freight | 28.2 | This line is already in operation with ETCS L1 and a migration to ETCS L2 is planned |

| Line | CNC | MS | Freight / Passenger | Length (Km) | Comments |
|---|---|---|---|---|---|
| Domodossola - Cuzzago | RALP | IT | Passenger and freight | 21.0 | This section is shared with the comprehensive line between Domodossola Novara |
| Domodossola - Novara (Diversionary line) | RALP | IT | Passenger and freight | 0 | This line is the comprehensive line between Domodossola Novara which is planned in the EDP by 2017 |
| Bologna - Firenze | SCM | IT | Passenger | 82.0 | |
| Novara - Rho | MED | IT | Passenger | 36.0 | |
| Roma - Salone - Napoli | SCM | IT | Passenger | 213.9 | |
| Torino - Novara | MED | IT | Passenger | 84.9 | |

## 14.2 *Lines under construction*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Bivio d' Aurisina - Trieste | MED | IT | Freight | 14.2 | 2015-IT-TM-0168-W | 31/12/2022 | |
| Bivio d' Aurisina - Villa Opicina - Border IT/SI (Sežana) | BAC - MED | IT | Passenger and freight | 12.6 | 2015-IT-TM-0168-W | 31/12/2022 | The total length of the line is the 17,5 km and the rest of the line is without ETCS |
| Border AT/IT (Brennero) - Fortezza | SCM | IT | Unselected | 0 | 2015-IT-TM-0168-W | 31/12/2022 | This line in the TENTec Viewer is shown as not belonging to the CNC. Although, in the EDP, it is shown as belonging to the SCM corridor |
| Portoguaro - Cervignano - Bivio d' Aurisina | BAC - MED | IT | Freight | 55.6 | 2015-IT-TM-0168-W | 31/12/2022 | |
| Direttissima Roma - Firenze | SCM | IT | Passenger | 239.9 | | 31/12/2021 | |
| Milano - Chiasso | RALP | IT | Passenger and freight | 48.5 | 2014-IT-TM-0058-W | 31/12/2021 | |
| Milano - Tortona | RALP | IT | Passenger and freight | 75.6 | 2016-IT-TM-0244-W | 31/12/2023 | |
| Milano - Verona | MED | IT | Passenger | 132.6 | | 31/12/2022 | The section which is with ETCS under construction is the Pioltello - Castelnuova |
| Novara - Rho | MED | IT | Freight | 33.5 | 2016-IT-TM-0244-W | 31/12/2022 | |
| Rho - Milano | MED - RALP | IT | Passenger | 1.0 | | 31/12/2022 | The total length of this line is 29 km, the rest of the line is without ETCS activity |
| Sesto Calende - Novara | RALP | IT | Freight | 3.5 | 2014-IT-TM-0058-W 2007-IT-60360-P | 31/12/2030 | The total length of this line is 30 km, the rest of the line is without ETCS activity |

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Tortona - Genova (Diversionary line) | RALP | IT | Passenger and freight | 0 | | 31/12/2021 | This line is the comprehensive line between Tortona - Genova which is planned in the EDP by 2020 |
| Vicenza - Portoguaro (diversionary line) | BAC - MED | IT | Unselected | 0 | 2015-IT-TM-0168-W | 31/12/2022 | This line is a comprehensive line and is planned in the EDP by 2020 |
| Venezia – Mirano - Padova | BAC - MED | IT | Passenger | 29.1 | 2016-IT-TM-0244-W | 31/12/2022 | |
| Verona - Vicenza - Padova | MED | IT | Passenger | 83.4 | 2016-IT-TM-0244-W | 31/12/2022 | |

### 14.3 *Funded lines*

The following table describes the CEF funded projects related to deployment of ERTMS lines that are expected to be under construction in a short term in this country.

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Verona - Bologna | SCM | IT | Passenger and freight | 92.3 | 2018-IT-TM-0059-W | 31/12/2026 | |

## 15. LATVIA

There are no lines or stretches with ETCS in operation, under construction or funded CEF Projects in any CNC in Latvia. According to the EDP, Latvia only has lines planned to be put in operation beyond 2023.

## 16. LITHUANIA

There are no lines or stretches with ETCS in operation, under construction or funded CEF project in any CNC in Lithuania. According to the EDP, Lithuania only has lines planned to be put in operation beyond 2023.

## 17. LUXEMBOURG

### 17.1 *Lines in operation*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Comments |
|---|---|---|---|---|---|
| Border BE/LU - Luxembourg | NSM | LU | Passenger | 18.3 | |
| Luxembourg - Lu Berchem JCT - Border LU/FR (Dudelange) | NSM | LU | Passenger and freight | 17.4 | |
| Border BE/LU - Bettembourg | NSM | LU | Freight | 29.8 | |
| Luxembourg - Oetrange - Lu Berchen JCT | NSM | LU | Passenger and freight | 20.2 | |
| Luxembourg - Border DE/LU | NSM | LU | Passenger and freight | 0 | |

# 18. NETHERLANDS

## 18.1 *Lines in operation*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Comments |
|---|---|---|---|---|---|
| Barendrecht - Geldermalsen - Nijmegen - Zevenaar | NSB - RALP | NL | Freight | 105.1 | This line in the NSB corridor is included in the Rotterdam – Meteren line |
| Rotterdam - Barendrecht - Breda - Border NL/BE (Galder) | NSB - RALP - NSM | NL | Passenger | 54.4 | |
| Barendrecht - Maasvlakte (Rotterdam port) | NSB - RALP - NSM | NL | Freight | 54.2 | |
| Schipol - Rotterdam | NSM | NL | Passenger | 52.7 | |
| Utrecht - Amsterdam | NSB - RALP | NL | Passenger and freight | 35.2 | |
| Zevenaar - German Border (NL/DE) | RALP | NL | Passenger and freight | 5.7 | |

## 18.2 *Lines in under construction*

No lines with ETCS under construction in the CNC.

## 18.3 *Funded lines*

The following table describes the CEF funded projects related to deployment of ERTMS lines that are expected to be under construction in a short term in this country.

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Border NL/BE (Essen) - Roosendaal - Barendrecht | NSB - RALP - NSM | NL | Passenger and freight | 49.9 | 2015-NL-TM-0264-W 2014-NL-TM-0230-S | 31/12/2028 | |

# 19. NORWAY

There are no lines with ETCS in operation or funded in the CNC in Norway. According to the EDP, Norway only has lines planned to be put in operation beyond 2023.

## 19.1 *Lines under construction*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Oslo - Border NO/SE (Kornsjø) | SCM | NO | Passenger and freight | 170.0 | | 31/12/2026 | The section under construction is from Holen to Fredreikstad |

# 20. POLAND

## 20.1 *Lines in operation*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Comments |
|---|---|---|---|---|---|
| Grodzisk Maz. - Zawiercie | BAC | PL | Passenger | 218.3 | This line is in operation with ETCS L1 and is planned to migrate to ETCS L2 |
| Wroclaw - Opole | BAC | PL | Passenger | 79.3 | |

### 20.2 *Lines under construction*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Gdynia/Gdańsk - Warszawa | BAC | PL | Passenger and freight | 350.4 | | 31/12/2020 | |
| Poznan - Wroclaw | BAC | PL | Passenger and freight | 162.8 | 2016-PL-TMC-0136-W | 31/12/2023 | |
| Warszawa - Grodzisk Maz. | BAC - NSB | PL | Passenger | 32.8 | | 31/12/2020 | |
| Poznan (Kiekrz - Lubon Koto Poznania) | BAC - NSB | PL | Passenger and freight | 11.2 | 2016-PL-TMC-0136-W | 31/12/2023 | |
| Border LT/PL (Mockava) - Warszawa | NSB | PL | Passenger and freight | 167.4 | 2015-PL-TM-0002-W | 31/12/2024 | The total length of the line is 362 and 101 km are funded by the CEF project 2016-PL-TMC-0135-W, the rest of the line is without ETCS activity |
| Warszawa - Skierniewice - Lowicz | NSB | PL | Passenger and freight | 82.0 | | 31/12/2028 | This line is located inside the route Warszawa - Grodzisk Maz. It is the Conventional line. |
| Warszawa - Lowicz - Poznań | NSB | PL | Passenger and freight | 290.2 | 2016-PL-TMC-0136-W | 31/12/2023 | |
| Warszawa | NSB | PL | Passenger and freight | 25.6 | | 31/12/2028 | The total length of the line is 34 km and 8,4 km are without ETCS activity |
| Warszawa - Lukow - Border PL/BY (Terespol) | NSB | PL | Passenger and freight | 198.8 | 2016-PL-TMC-0136-W | 31/12/2028 | |
| Skierniewice - Lukow | NSB | PL | Freight | 158.1 | | 31/12/2028 | |
| Poznań - Border PL/DE (Bundesgrenze/Oderbruecke) | NSB | PL | Passenger and freight | 170.7 | 2016-PL-TMC-0136-W | 31/12/2023 | |

### 20.3 *Funded lines*

The following table describes the CEF funded projects related to deployment of ERTMS lines that are expected to be under construction in a short term in this country.

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Border LT/PL (Mockava) - Warszawa | NSB | PL | Passenger and freight | 101.0 | 2016-PL-TMC-0135-W | 31/12/2024 | |

# 21. PORTUGAL

## 21.1 *Lines in operation*

There are no lines with ETCS in operation in the CNC in Portugal. According to the EDP, Portugal only has lines planned to be in operation beyond 2023.

## 21.2 *Lines under construction*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Border ES/PT (Badajoz) - Poceirão - Lisboa | ATL | PT | Passenger and freight | 87.2 | 2014-PT-TM-0627-M | 31/12/2020 | |
| Pampilhosa - Border ES/PT (Vilar Formoso) | ATL | ES | Passenger | 201.2 | | 31/12/2020 | |

## 21.3 *Funded lines*

Portugal has been assigned CEF project 2014-PT-TM-0627-M. The line that is associated with this CEF project is already under construction.

# 22. ROMANIA

## 22.1 *Lines in operation*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Comments |
|---|---|---|---|---|---|
| Brazi - București | RO | RDN | Passenger and freight | 40.1 | |
| București - Fetești - Constanța | RO | RDN | Freight | 219.1 | |

## 22.2 *Lines under construction*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Simeria - Sighișoara | RDN | RO | Passenger and freight | 165.7 | | 31/12/2025 | |
| RO/BG Border (Vidin) - Calafat | OEM | RO | Passenger and freight | 0.7 | | 31/12/2025 | |
| Border RO/HU (Curtici) - Arad | OEM - RDN | RO | Passenger and freight | 26.2 | | 31/12/2020 | |
| Arad - Simeria | RDN | RO | Passenger and freight | 158.5 | | 31/12/2025 | |

## 22.3 *Funded lines*

The following table describes the CEF funded projects related to deployment of ERTMS lines that are expected to be under construction in a short term in this country.

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Sighișoara - Brașov | RDN | RO | Passenger and freight | 127.1 | 2014-RO-TMC-0639-W | 31/12/2025 | |

# 23. SLOVAKIA

## 23.1 *Lines in operation*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Comments |
|---|---|---|---|---|---|
| Puchov - Trenčín | BAC | SK | Passenger and freight | 57.9 | |
| Trenčín - Bratislava | BAC | SK | Passenger and freight | 95.1 | |
| Žilina - Čadca | BAC - RDN | SK | Passenger and freight | 33.9 | |

## 23.2 *Lines under construction*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Púchov - Žilina | BAC - RDN | SK | Passenger and freight | 45.8 | | 31/12/2023 | |

## 23.3 *Funded lines*

No line belonging to any CNC has a CEF project associated in Slovakia.

# 24. SLOVENIA

## 24.1 *Lines in operation*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Comments |
|---|---|---|---|---|---|
| Pragersko - Border SI/HU (Hodos) | MED | SI | Passenger and freight | 109.3 | |
| Ljubljana - Zidani Most | BAC - MED | SI | Passenger and freight | 65.3 | |
| Divača - Postojna - Ljubljana (Freight) | BAC - MED | SI | Freight | 104.1 | |
| Divača - Koper | BAC - MED | SI | Freight | 23.8 | |
| Border IT/SI - Divača (Conventional) | BAC - MED | SI | Passenger and freight | 12.7 | |

## 24.2 *Lines under construction*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Zidani Most - Border SI/HR (Dobova/Savski) | MED | SI | Passenger and freight | 51.2 | | 31/12/2023 | |
| Pragersko - Zidani Most | BAC - MED | SI | Passenger and freight | 74.2 | 2013-SI-60017-P | 31/12/2020 | |
| Border AT/ SI (Sentji/Spieldfeld-Strass) - Maribor - Pragersko | BAC | SI | Passenger and freight | 18.8 | 2015-SI-TM-0111-W | 31/12/2023 | |

### 24.3 *Funded lines*

Slovenia has been assigned CEF projects 2013-SI-60017-P, 2015-SI-TM-0111-W and 2013-SI-60017-P, but the lines that are associated to these projects are already under construction or in operation.

## 25. SPAIN

### 25.1 *Lines in operation*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Comments |
|---|---|---|---|---|---|
| Córdoba - Antequera (Bobadilla) | MED - ATL | ES | Passenger | 96.9 | |
| Antequera (Bobadilla) - Granada | MED | ES | Passenger and freight | 121.3 | |
| Monforte del Cid - La Encina | MED | ES | Passenger | 45.7 | |
| Valencia | MED | ES | Passenger | 3.9 | |
| Valencia - Tarragona | MED | ES | Passenger and freight | 51.0 | The total length of this line is 141,080 km. 51,020 km of this length are under construction |
| Madrid - Lérida (HS) | MED | ES | Passenger and freight | 330.9 | This line is in operation with ETCS L1 and is planned to migrate to ETCS L2 |
| Lérida - Barcelona (HS) | MED | ES | Passenger | 313.5 | This line is in operation with ETCS L1 and is planned to migrate to ETCS L2 |
| Barcelona - Border ES/FR (Figueras) | MED | ES | Passenger | 151.3 | This line is in operation with ETCS L1 and is planned to migrate to ETCS L2 |
| Madrid - Valladolid (HS) | ATL | ES | Passenger | 178.5 | This line is in operation with ETCS L1 and is planned to migrate to ETCS L2 |
| Valladolid - Burgos (High speed) | ATL | ES | Passenger | 37.4 | The total length of this line is 204,755 km. 167,343 km of this length are under construction |

### 25.2 *Lines under construction*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Barcelona - Border ES/FR (Figueras) | MED | ES | Passenger | 8.0 | | 31/12/2022 | Barcelona node |
| Cáceres - Mérida | ATL | ES | Passenger and freight | 62.9 | | 31/12/2020 | |
| Mérida - Badajoz - Border ES/PT (Lisboa) | ATL | ES | Passenger and freight | 64.2 | | 31/12/2030 | |
| Olmedo - Medina del Campo | ATL | ES | Passenger | 17.9 | | 31/12/2020 | |

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Valladolid - Burgos (High speed) | ATL | ES | Passenger and freight | 167.3 | 2014-ES-TM-0514-W | | The total length of this line is 204,755 km. 37,412 km of this length are already in operation. |
| Valencia - Tarragona (High speed) | MED | ES | Passenger and freight | 71.7 | | 31/12/2020 | |
| Valencia - Tarragona | MED | ES | Passenger and freight | 141.1 | | 31/12/2020 | The total length of this line is 192,100 km. 51,020 km of this length are already in operation. |
| Murcia - Elche - Monforte del Cid | MED | ES | Passenger and freight | 73.3 | | 31/12/2020 | |
| La Llagosta - Nudo Mollet - Castellbisball | MED | ES | Freight | 22.1 | | 31/12/2020 | |
| Tarragona - Castellbisbal - Barcelona | MED | ES | Freight | 23.7 | | 31/12/2020 | |
| La Encina - Valencia (High speed) | MED | ES | Passenger and freight | 103.6 | | 31/12/2020 | |

### 25.3 *Funded lines*

The following table describes the CEF funded projects related to deployment of ERTMS lines that are expected to be under construction in a short term in this country.

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Bergara - Irún (Border ES/FR) | ATL | ES | Passenger and freight | 76.7 | 2015-ES-TM-0118-W | 31/12/2023 | |
| Vitoria - Bergara - Bilbao | ATL | ES | Passenger and freight | 93.4 | 2015-ES-TM-0118-W | 31/12/2023 | |

## 26. SWEDEN

There are no sections with ETCS in operation, under construction or funded CEF Projects in the CNC in Sweden. According to the EDP, Sweden does not have any lines expected to be in operation by 2023.

## 27. SWITZERLAND

### 27.1 *Lines in operation*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Comments |
|---|---|---|---|---|---|
| Muttenz - Brunnen - Erstfeld | RALP | CH | Passenger and freight | 142.0 | |
| Visp - Border CH/IT (Iselle di Tasquera) | RALP | CH | Passenger and freight | 23.0 | |
| Border FR/CH - Basel (St. Jakob) | RALP | CH | Passenger and freight | 7.3 | |

| Line | CNC | MS | Freight / Passenger | Length (Km) | Comments |
|---|---|---|---|---|---|
| Basel (St. Jakob) - Muttenz | RALP | CH | Passenger and freight | 3.9 | |
| Mattstetten - Bern - Frutigen | RALP | CH | Passenger and freight | 59.4 | |
| Bodio - Pollegio - Biasca - Giubiasco | RALP | CH | Passenger and freight | 27.4 | |
| Erstfeld - Bodio | RALP | CH | Passenger and freight | 57.3 | |
| Frutigen - Visp | RALP | CH | Passenger and freight | 39.3 | |
| Giubiasco - Sant' Antonino | RALP | CH | Passenger and freight | 22.8 | |
| Rothrist - Mattstetten | RALP | CH | Passenger and freight | 44.0 | |
| Muttenz - Olten - Rothrist | RALP | CH | Passenger and freight | 40.9 | |
| Vezia - Lugano - Balerna - Border CH/IT (Chiasso Vg) | RALP | CH | Passenger and freight | 28.4 | |

### 27.2 *Lines under construction*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Project Code | MS planned finish date | Comments |
|---|---|---|---|---|---|---|---|
| Border DE/CH - Basel | RALP | CH | Passenger and freight | 4.3 | | 31/12/2021 | |
| Sant' Antonino - Vezia | RALP | CH | Passenger and freight | 17.4 | | 31/12/2020 | |

## 28. UNITED KINGDOM

### 28.1 *Lines in operation*

| Line | CNC | MS | Freight / Passenger | Length (Km) | Comments |
|---|---|---|---|---|---|
| London - Border UK/FR (Dover) | NSM | UK | Freight | 2.8 | |

### 28.2 *Lines under construction*

There are no lines belonging to any CNC currently under construction in the United Kingdom.

### 28.3 *Funded lines*

There are no CEF Projects assigned to any line belonging to a CNC in the United Kingdom.

## ANNEX B: THE GAPS WEIGHTED MATRIX PER MEMBER STATE

This Annex shows the Gaps Weighted Matrix per Member State. The points of the Weighted Matrix are awarded following the methodology explained in Section 4.

The gaps considered for the purposes of this study are sections that are not expected to have ETCS under construction or in operation in the short term on the Core Network Corridors (CNC).

### 1. AUSTRIA

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gaps in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM- R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Innsbruck - Border AT/IT (Brennero base tunnel) | 78 | 78 | 6 | 10 | 8 | 7 | 5 | 4 | 4 | 0 | 2 | 2 | 0 | 0 | 47 |
| Wien node 2 | 74 | 74 | 11 | 8 | 8 | 0 | 5 | 4 | 4 | 0 | 2 | 2 | 0 | 1 | 45 |
| Linz - Gross Sierning (Knoten Rohr) | 71 | 71 | 11 | 8 | 3 | 0 | 5 | 4 | 4 | 4 | 2 | 2 | 0 | 0 | 43 |
| Werndorf - Border AT/ SI (Sentji/Spieldfeld-Strass) | 62 | 74 | 6 | 0 | 7 | 7 | 5 | 0 | 4 | 4 | 2 | 2 | 0 | 1 | 37 |
| Parndorf - Border AT/SK (Petrzalka) | 60 | 60 | 6 | 3 | 7 | 7 | 5 | 1 | 4 | 0 | 2 | 2 | 0 | 0 | 36 |
| Wien node 1 | 59 | 70 | 11 | 0 | 7 | 0 | 5 | 0 | 4 | 4 | 2 | 2 | 0 | 0 | 35 |
| Wien - Border AT/SK (Marchegg) | 50 | 50 | 0 | 1 | 6 | 7 | 5 | 2 | 4 | 0 | 2 | 2 | 0 | 1 | 30 |
| Graz - Werndorf - Klagenfurt- Border AT/IT (Thoerl-Maglern) | 47 | 47 | 0 | 6 | 0 | 7 | 5 | 2 | 4 | 0 | 2 | 2 | 0 | 0 | 28 |
| Wr. Neustadt - Graz | 45 | 45 | 0 | 6 | 2 | 0 | 5 | 2 | 4 | 4 | 2 | 2 | 0 | 0 | 27 |
| Gramatneusiedl - Wampersdorf | 45 | 53 | 6 | 0 | 7 | 0 | 5 | 0 | 4 | 0 | 2 | 2 | 0 | 1 | 27 |
| Wien - Wampersdorf - Wr. Neustadt | 34 | 46 | 0 | 0 | 6 | 0 | 5 | 0 | 4 | 0 | 2 | 2 | 0 | 1 | 20 |

## 2. BELGIUM

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Noorderdokken - Border BE/NL (Essen/Roosendaal) | 87 | 87 | 11 | 5 | 8 | 7 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 1 | 52 |
| Border BE/DE (Botzelaer) - Visé - Liège | 81 | 81 | 11 | 10 | 4 | 7 | 5 | 0 | 4 | 0 | 2 | 2 | 2 | 1 | 49 |
| Antwerpen - Aarschot - Leuven | 78 | 78 | 11 | 8 | 7 | 0 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 1 | 47 |
| Border FR/BE (Mouscron) - Gent - Antwerpen | 75 | 75 | 11 | 5 | 0 | 7 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 1 | 45 |
| Bruxelles/Brussels node | 72 | 72 | 11 | 0 | 7 | 7 | 5 | 2 | 4 | 4 | 0 | 2 | 0 | 1 | 43 |
| Mechelen - Nekkerspoel | 65 | 65 | 11 | 0 | 8 | 0 | 5 | 4 | 4 | 4 | 0 | 2 | 0 | 1 | 39 |
| Antwerpen port | 61 | 61 | 6 | 8 | 7 | 0 | 5 | 0 | 4 | 4 | 0 | 2 | 0 | 1 | 36 |
| Namur - Cigney - Border BE/LU (Luxembourg) | 61 | 61 | 11 | 0 | 1 | 7 | 5 | 1 | 4 | 0 | 2 | 2 | 2 | 1 | 36 |
| Border FR/BE (Wannehein) - Halle - Bruxelles/Brussel | 59 | 59 | 6 | 0 | 2 | 7 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 1 | 35 |
| Bruxelles/Brussel - Ottignies | 58 | 58 | 11 | 0 | 6 | 0 | 5 | 2 | 4 | 4 | 0 | 2 | 0 | 1 | 35 |
| Visé-Haut - Hasselt - Aarschot | 54 | 54 | 0 | 10 | 2 | 0 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 1 | 33 |
| Zeebruge - Brugge - Gent | 50 | 50 | 0 | 2 | 7 | 0 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 1 | 30 |
| Brugge - Oostende | 47 | 47 | 0 | 0 | 6 | 0 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 1 | 28 |

## 3. BULGARIA

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sofia - Septemvri | 76 | 76 | 6 | 10 | 8 | 0 | 5 | 4 | 4 | 4 | 2 | 2 | 0 | 1 | 46 |
| Sofia - Radomir - Border BG/EL | 56 | 56 | 6 | 2 | 3 | 7 | 5 | 1 | 4 | 4 | 0 | 0 | 2 | 0 | 33 |
| Vidin - Brusartsi - Sofia | 34 | 34 | 6 | 0 | 0 | 0 | 5 | 0 | 4 | 4 | 0 | 0 | 2 | 0 | 21 |

## 4. CROATIA

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Zaprešić - Zagreb - Dugo Selo – Border HU/HR | 80 | 80 | 6 | 10 | 6 | 7 | 5 | 4 | 4 | 4 | 0 | 0 | 2 | 0 | 48 |
| Border SI/HR (Dobova/Savski) - Zaprešić | 65 | 65 | 6 | 0 | 8 | 7 | 5 | 4 | 4 | 4 | 0 | 0 | 2 | 0 | 39 |
| Horvati - Dugo Selo | 46 | 46 | 6 | 3 | 7 | 0 | 5 | 1 | 0 | 4 | 0 | 0 | 2 | 0 | 27 |
| Zaprešić - Horvati | 41 | 41 | 0 | 2 | 8 | 0 | 5 | 3 | 0 | 4 | 0 | 0 | 2 | 0 | 25 |
| Horvati - Oštarije - Rijeka | 28 | 28 | 0 | 2 | 0 | 0 | 5 | 0 | 4 | 4 | 0 | 0 | 2 | 0 | 17 |

## 5. CZECHIA

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ostrava - Český Těšín - Border CZ/SK (Mosty u Jablunkova) | 80 | 80 | 6 | 9 | 5 | 7 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 0 | 48 |
| Border DE/CZ (Bundesgrenze) - Děčín - Praha | 78 | 78 | 6 | 9 | 3 | 7 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 1 | 47 |
| Border PL/CZ (Raciborz) - Bohumin | 71 | 71 | 6 | 3 | 8 | 7 | 5 | 0 | 4 | 4 | 2 | 2 | 2 | 0 | 43 |
| Beroun - Praha | 71 | 71 | 11 | 3 | 6 | 0 | 5 | 4 | 4 | 4 | 2 | 2 | 2 | 0 | 42 |
| Hranice - Border CZ/SK (Hranice/Púchov) | 66 | 66 | 6 | 3 | 5 | 7 | 5 | 2 | 4 | 4 | 2 | 1 | 2 | 0 | 40 |
| Praha - Lysa n. Labem | 63 | 63 | 11 | 1 | 7 | 0 | 5 | 3 | 4 | 0 | 2 | 2 | 2 | 1 | 38 |
| Děčín - Ústí n. Labern Strekov - Lysá n.Labem (Praha) - Kolín | 53 | 53 | 6 | 10 | 0 | 0 | 5 | 1 | 4 | 0 | 2 | 2 | 2 | 0 | 32 |
| Border DE/CZ (Furth im Wald/Ceska Kubice) - Plzeň | 53 | 53 | 6 | 1 | 5 | 7 | 5 | 1 | 4 | 0 | 2 | 0 | 2 | 0 | 32 |
| Prerov - Brno | 51 | 51 | 11 | 3 | 4 | 0 | 5 | 0 | 4 | 0 | 2 | 0 | 2 | 0 | 31 |
| Prerov - Brno (HS) | 49 | 49 | 11 | 0 | 4 | 0 | 5 | 1 | 4 | 0 | 2 | 0 | 2 | 0 | 30 |

## 6. DENMARK

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Border SE/DK (Malmö) - København | 83 | 83 | 6 | 7 | 8 | 7 | 5 | 4 | 4 | 4 | 2 | 2 | 2 | 0 | 50 |

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ringsted - Snoghøj - Border DK/DE (Padborg) | 72 | 72 | 6 | 10 | 0 | 7 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 0 | 43 |
| København - Ringsted | 71 | 71 | 11 | 9 | 7 | 0 | 5 | 1 | 4 | 0 | 2 | 2 | 2 | 0 | 43 |
| Nykøbing - Border DK/DE (Puttgarden) | 59 | 59 | 6 | 0 | 8 | 7 | 5 | 0 | 0 | 4 | 2 | 2 | 2 | 0 | 35 |

## 7. ESTONIA

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tallinn – Valga (border EE/LV) | 65 | 65 | 0 | 10 | 0 | 7 | 5 | 4 | 4 | 4 | 2 | 1 | 2 | 0 | 0 |
| Tallinn - Border EE/LV (Moisakula) | 47 | 47 | 0 | 0 | 8 | 7 | 5 | 0 | 0 | 4 | 2 | 0 | 2 | 0 | 28 |

## 8. FINLAND

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Border RU/FI (Vainikkala) - Kouvola | 64 | 64 | 0 | 10 | 4 | 7 | 5 | 0 | 4 | 4 | 0 | 2 | 2 | 0 | 38 |
| Juurikorpi - Kotka | 54 | 54 | 0 | 8 | 7 | 0 | 5 | 0 | 4 | 4 | 0 | 2 | 2 | 0 | 32 |
| Kouvola – Juurikorpi - Hamina | 50 | 50 | 0 | 7 | 6 | 0 | 5 | 0 | 4 | 4 | 0 | 2 | 2 | 0 | 30 |
| Helsinki | 48 | 48 | 0 | 0 | 8 | 0 | 5 | 4 | 4 | 4 | 0 | 2 | 2 | 0 | 29 |
| Kouvola - Helsinki | 36 | 36 | 0 | 3 | 1 | 0 | 5 | 0 | 4 | 4 | 0 | 2 | 2 | 0 | 22 |

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Helsinki - Turku/Naantali | 29 | 29 | 0 | 0 | 0 | 0 | 5 | 0 | 4 | 4 | 0 | 2 | 2 | 0 | 17 |

## 9. FRANCE

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rémilly - Border FR/DE (Bundergrenze) | 83 | 83 | 11 | 7 | 7 | 7 | 5 | 0 | 4 | 4 | 0 | 2 | 2 | 0 | 50 |
| Lille - Border FR/BE (Mouscron) | 80 | 80 | 11 | 5 | 8 | 7 | 5 | 1 | 4 | 4 | 0 | 2 | 2 | 0 | 48 |
| Border UK/FR (Calais) - Cassel JCT - Lille | 67 | 67 | 0 | 9 | 6 | 7 | 5 | 2 | 4 | 4 | 0 | 1 | 2 | 0 | 40 |
| Strasbourg - Border FR/DE (Strasbourg/Khel) | 66 | 77 | 6 | 0 | 8 | 7 | 5 | 0 | 4 | 4 | 2 | 2 | 2 | 0 | 39 |
| Border ES/FR (Portbou) - Perpignan | 61 | 61 | 6 | 4 | 7 | 7 | 5 | 0 | 4 | 0 | 0 | 2 | 2 | 0 | 37 |
| Perpignan - Montpellier | 59 | 59 | 11 | 7 | 5 | 0 | 5 | 1 | 0 | 4 | 0 | 0 | 2 | 0 | 35 |
| Saint-Laurent-de-Mure - Chambéry - Border FR/IT | 59 | 59 | 6 | 4 | 5 | 7 | 5 | 1 | 4 | 0 | 0 | 2 | 2 | 0 | 35 |
| Irún (Border ES/FR) - Separation Dax/Tolouse - Bordeaux | 58 | 58 | 11 | 0 | 4 | 7 | 5 | 0 | 0 | 4 | 0 | 2 | 2 | 0 | 35 |
| Monts - Paris - Noisy-Le-Sec | 57 | 57 | 11 | 1 | 3 | 0 | 5 | 3 | 4 | 4 | 0 | 2 | 2 | 0 | 34 |
| Dijon – Mâcon | 57 | 57 | 0 | 10 | 6 | 0 | 5 | 2 | 4 | 4 | 0 | 2 | 2 | 0 | 34 |
| Paris | 57 | 57 | 6 | 2 | 7 | 0 | 5 | 3 | 4 | 4 | 0 | 2 | 2 | 0 | 34 |

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Orléans - Paris (Noisy-le-Sec) | 57 | 57 | 6 | 9 | 6 | 0 | 5 | 1 | 4 | 0 | 0 | 2 | 2 | 0 | 34 |
| Fretin - Border FR/BE (Wannehein) | 55 | 55 | 0 | 0 | 8 | 7 | 5 | 1 | 4 | 4 | 0 | 2 | 2 | 0 | 33 |
| Paris (Noisy-le-Sec) - Châlons-en-Champagne - Metz | 55 | 55 | 6 | 8 | 2 | 0 | 5 | 0 | 4 | 4 | 0 | 2 | 2 | 0 | 33 |
| Hazebrouck II - Dunkerque | 54 | 54 | 0 | 7 | 7 | 0 | 5 | 1 | 4 | 4 | 0 | 2 | 2 | 0 | 32 |
| Irún (Border ES/FR) - Dax - Bordeaux | 54 | 54 | 0 | 3 | 4 | 7 | 5 | 1 | 4 | 4 | 0 | 2 | 2 | 0 | 32 |
| Paris - Lille | 53 | 53 | 6 | 6 | 3 | 0 | 5 | 1 | 4 | 4 | 0 | 2 | 2 | 0 | 32 |
| Mâcon - Lyon | 53 | 53 | 0 | 10 | 7 | 0 | 5 | 2 | 4 | 0 | 0 | 2 | 2 | 0 | 32 |
| Nîmes - Avignon JCT | 52 | 52 | 6 | 1 | 7 | 0 | 5 | 1 | 4 | 4 | 0 | 1 | 2 | 0 | 31 |
| Perpignan - Avignon JCT | 51 | 51 | 6 | 7 | 4 | 0 | 5 | 1 | 4 | 0 | 0 | 2 | 2 | 0 | 31 |
| Paris - Fretin - Lille | 51 | 51 | 6 | 0 | 4 | 0 | 5 | 4 | 4 | 4 | 0 | 2 | 2 | 0 | 30 |
| Saint-Laurent-de-Mure - Chambéry - Border FR/IT (Modane) | 50 | 50 | 0 | 4 | 5 | 7 | 5 | 1 | 0 | 4 | 0 | 2 | 2 | 0 | 30 |
| Metz - Pagny - Toul - Dijon | 49 | 49 | 0 | 9 | 3 | 0 | 5 | 0 | 4 | 4 | 0 | 2 | 2 | 0 | 29 |
| Dijon - Villers-les-Pots - Mulhouse | 48 | 48 | 6 | 0 | 6 | 0 | 5 | 1 | 4 | 4 | 0 | 2 | 2 | 0 | 29 |
| Dijon - Dole - Mulhouse | 46 | 46 | 6 | 1 | 3 | 0 | 5 | 1 | 4 | 4 | 0 | 2 | 2 | 0 | 28 |
| Border UK/FR (Calais) - Hazebrouck - Lille | 46 | 46 | 0 | 1 | 6 | 7 | 5 | 1 | 4 | 0 | 0 | 1 | 2 | 0 | 28 |
| Paris (St. Lazare) - Rouen | 42 | 42 | 0 | 3 | 6 | 0 | 5 | 1 | 4 | 4 | 0 | 1 | 2 | 0 | 25 |
| Lyon - Miramas - Marseille | 41 | 41 | 0 | 6 | 2 | 0 | 5 | 1 | 4 | 4 | 0 | 2 | 2 | 0 | 25 |
| Miramas - Fos-sur-Mer | 41 | 41 | 0 | 0 | 8 | 0 | 5 | 0 | 4 | 4 | 0 | 1 | 2 | 0 | 24 |

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bordeaux - Orléans | 40 | 40 | 6 | 5 | 0 | 0 | 5 | 1 | 4 | 0 | 0 | 2 | 2 | 0 | 24 |
| Paris (Noisy-le-Sec) - Serqueux - Le Havre | 38 | 38 | 6 | 2 | 4 | 0 | 5 | 0 | 4 | 0 | 0 | 0 | 2 | 0 | 23 |
| Lyon - Marseille (High speed) | 37 | 37 | 0 | 0 | 3 | 0 | 5 | 3 | 4 | 4 | 0 | 2 | 2 | 0 | 22 |
| Paris (St. Lazare) - Rouen - Le Havre | 29 | 29 | 0 | 0 | 4 | 0 | 5 | 0 | 0 | 4 | 0 | 2 | 2 | 0 | 17 |
| Dijon - Lyon | 29 | 29 | 0 | 0 | 4 | 0 | 5 | 0 | 0 | 4 | 0 | 2 | 2 | 0 | 17 |

## 10. GERMANY

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| German border (NL/DE) - Duisburg | 85 | 85 | 11 | 5 | 7 | 7 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 0 | 51 |
| Köln node - Aachen | 83 | 83 | 11 | 3 | 7 | 7 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 1 | 50 |
| Border FR/DE (Strasbourg/Kehl) - Appenweier | 78 | 78 | 11 | 1 | 8 | 7 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 0 | 47 |
| Nürnberg - Ingolstadt - München node - Border DE/AT (Kufstein) | 77 | 77 | 11 | 3 | 5 | 7 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 0 | 46 |
| Bitterfeld - Leipzig | 75 | 75 | 11 | 5 | 8 | 0 | 5 | 2 | 4 | 4 | 2 | 1 | 2 | 1 | 45 |
| Erkner - Berlin | 71 | 71 | 11 | 3 | 8 | 0 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 0 | 43 |
| Karlsruhe - Sttutgart | 70 | 70 | 11 | 4 | 6 | 0 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 0 | 42 |
| Berlin - Bitterfeld | 70 | 70 | 11 | 1 | 8 | 0 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 1 | 42 |
| Berlin Node | 69 | 69 | 11 | 4 | 7 | 0 | 5 | 1 | 4 | 4 | 2 | 1 | 2 | 0 | 42 |
| Leipzig - Border DE/CZ (Bundesgrenze) | 69 | 69 | 6 | 4 | 6 | 7 | 5 | 2 | 4 | 4 | 0 | 2 | 2 | 0 | 41 |
| Nassenheide - Berlin | 66 | 66 | 11 | 1 | 8 | 0 | 5 | 1 | 4 | 4 | 2 | 1 | 2 | 0 | 39 |

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frankfurt- Gross Gerau | 65 | 65 | 6 | 3 | 8 | 0 | 5 | 4 | 4 | 4 | 2 | 2 | 2 | 0 | 39 |
| Ulm - München - Border DE/AT (Freilassing/Salzburg) | 65 | 65 | 11 | 2 | 4 | 0 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 0 | 39 |
| Regensburg - Passau | 62 | 62 | 6 | 7 | 7 | 0 | 5 | 2 | 4 | 4 | 0 | 2 | 2 | 0 | 37 |
| Hannover - Köln | 61 | 61 | 6 | 4 | 6 | 0 | 5 | 3 | 4 | 4 | 2 | 2 | 2 | 0 | 36 |
| München - Regensburg | 59 | 59 | 6 | 2 | 7 | 0 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 0 | 36 |
| Mannheim - Gross Gerau | 58 | 58 | 6 | 3 | 7 | 0 | 5 | 4 | 4 | 0 | 2 | 2 | 2 | 0 | 35 |
| Leipzig - München | 58 | 58 | 11 | 1 | 3 | 0 | 5 | 1 | 4 | 4 | 2 | 1 | 2 | 0 | 35 |
| Würzburg - Nürnberg | 58 | 58 | 0 | 6 | 6 | 0 | 5 | 3 | 4 | 4 | 2 | 2 | 2 | 0 | 35 |
| Osnabrück - Border DE/NL (German border II) | 57 | 57 | 0 | 4 | 7 | 7 | 5 | 1 | 4 | 0 | 2 | 2 | 2 | 0 | 34 |
| Darmstadt - Frankfurt am Main | 57 | 57 | 6 | 0 | 8 | 0 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 0 | 34 |
| Regensburg - Border DE/CZ (Furth im Wald/Ceska Kubice) | 57 | 57 | 0 | 1 | 7 | 7 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 0 | 34 |
| Treuchtlingen - München | 57 | 57 | 0 | 5 | 7 | 0 | 5 | 3 | 4 | 4 | 2 | 2 | 2 | 0 | 34 |
| Mannheim - Hockenheim | 56 | 56 | 0 | 10 | 8 | 0 | 5 | 1 | 4 | 0 | 2 | 2 | 2 | 0 | 34 |
| Hannover - Osnabrück | 56 | 56 | 0 | 6 | 7 | 0 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 0 | 34 |
| Hildesheim - Göttingen | 56 | 56 | 0 | 9 | 6 | 0 | 5 | 2 | 4 | 4 | 0 | 2 | 2 | 0 | 34 |
| Bremen - Nienburg - Hannover | 55 | 55 | 0 | 8 | 6 | 0 | 5 | 2 | 4 | 4 | 0 | 2 | 2 | 0 | 33 |
| Nürnberg - Schirding | 55 | 55 | 6 | 1 | 6 | 0 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 0 | 33 |
| Bremen - Bremerhaven | 55 | 55 | 0 | 7 | 7 | 0 | 5 | 2 | 4 | 4 | 0 | 2 | 2 | 0 | 33 |
| Troisdorf - Frankfurt | 54 | 54 | 6 | 0 | 6 | 0 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 0 | 33 |
| Göttingen - Fulda | 54 | 54 | 0 | 9 | 6 | 0 | 5 | 1 | 4 | 4 | 0 | 1 | 2 | 0 | 32 |
| Hannover - Magdeburg | 54 | 54 | 0 | 7 | 6 | 0 | 5 | 2 | 4 | 4 | 0 | 2 | 2 | 0 | 32 |

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Border DK/DE (Puttgarden) - Lübeck | 53 | 53 | 0 | 0 | 7 | 7 | 5 | 2 | 4 | 4 | 0 | 1 | 2 | 0 | 32 |
| Nürnberg - Regensburg | 53 | 53 | 0 | 8 | 7 | 0 | 5 | 2 | 4 | 0 | 2 | 2 | 2 | 0 | 32 |
| Flensburg Weiche - Hamburg | 53 | 53 | 6 | 3 | 5 | 0 | 5 | 2 | 4 | 4 | 0 | 1 | 2 | 0 | 32 |
| Nürnberg - Treuchtlingen | 53 | 53 | 6 | 2 | 7 | 0 | 5 | 2 | 4 | 0 | 2 | 2 | 2 | 0 | 32 |
| Berlin - Werder (Havel) - Magdeburg | 52 | 52 | 0 | 7 | 6 | 0 | 5 | 2 | 4 | 4 | 0 | 1 | 2 | 0 | 31 |
| Hamburg - Lauenbruck | 52 | 52 | 0 | 6 | 7 | 0 | 5 | 1 | 4 | 4 | 0 | 2 | 2 | 0 | 31 |
| Mannheim - Heidelberg - Karlsruhe | 52 | 52 | 6 | 2 | 7 | 0 | 5 | 4 | 4 | 0 | 0 | 2 | 2 | 0 | 31 |
| Rosslau - Dessau - Bitterfeld | 52 | 52 | 0 | 5 | 8 | 0 | 5 | 2 | 4 | 4 | 0 | 2 | 2 | 0 | 31 |
| Waghäusel - Bruchsal - Stuttgart | 51 | 51 | 6 | 1 | 7 | 0 | 5 | 2 | 4 | 0 | 2 | 2 | 2 | 0 | 31 |
| Stuttgart - Ulm (High-Speed) | 50 | 50 | 0 | 4 | 7 | 0 | 5 | 3 | 4 | 0 | 2 | 2 | 2 | 1 | 30 |
| Frankfurt am Main - Würzburg | 50 | 50 | 0 | 3 | 6 | 0 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 0 | 30 |
| Hamburg - Uelzen - Hannover (Hildesheim) | 50 | 50 | 0 | 6 | 6 | 0 | 5 | 3 | 4 | 0 | 2 | 2 | 2 | 0 | 30 |
| Köln - Düsseldorf - Duisburg | 49 | 49 | 0 | 4 | 7 | 0 | 5 | 4 | 4 | 0 | 0 | 2 | 2 | 1 | 29 |
| Magdeburg - Rosslau | 48 | 48 | 0 | 4 | 7 | 0 | 5 | 1 | 4 | 4 | 0 | 2 | 2 | 0 | 29 |
| Bremen - Wilhelmshaven | 47 | 47 | 0 | 2 | 7 | 0 | 5 | 2 | 4 | 4 | 0 | 2 | 2 | 0 | 28 |
| Mainz-Bischofsheim - Frankfurt | 47 | 59 | 6 | 0 | 8 | 0 | 5 | 0 | 4 | 0 | 2 | 2 | 2 | 0 | 28 |
| Berlin - Brieselang - Hamburg | 47 | 47 | 0 | 3 | 5 | 0 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 0 | 28 |
| Lübeck - Hamburg | 46 | 46 | 0 | 1 | 7 | 0 | 5 | 2 | 4 | 4 | 0 | 2 | 2 | 0 | 28 |
| Lauenbruck - Bremen | 45 | 45 | 0 | 6 | 7 | 0 | 5 | 1 | 4 | 0 | 0 | 2 | 2 | 0 | 27 |
| Hamburg - Berlin | 45 | 45 | 0 | 2 | 8 | 0 | 5 | 1 | 4 | 4 | 0 | 1 | 2 | 0 | 27 |
| Rosslau - Elsterwerda | 45 | 45 | 0 | 3 | 7 | 0 | 5 | 1 | 4 | 4 | 0 | 2 | 2 | 0 | 27 |

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Würzburg - Treuchtlingen | 44 | 44 | 0 | 6 | 6 | 0 | 5 | 1 | 4 | 0 | 0 | 2 | 2 | 0 | 27 |
| Berlin Blankenfelde - Elsterwerda - Dresden | 43 | 43 | 0 | 2 | 6 | 0 | 5 | 1 | 4 | 4 | 0 | 2 | 2 | 0 | 26 |
| Hannover - Hildesheim | 42 | 42 | 0 | 4 | 7 | 0 | 5 | 2 | 4 | 0 | 0 | 1 | 2 | 0 | 25 |
| Berlin (ring network) | 42 | 51 | 0 | 0 | 6 | 0 | 5 | 0 | 4 | 4 | 2 | 2 | 2 | 0 | 25 |
| Berlin - Wolfsburg - Hannover | 40 | 43 | 0 | 0 | 5 | 0 | 5 | 0 | 4 | 4 | 2 | 2 | 2 | 0 | 24 |
| Lauenbruck - Visselhoevede - Hannover | 37 | 37 | 0 | 0 | 7 | 0 | 5 | 4 | 4 | 0 | 0 | 1 | 2 | 0 | 22 |
| Göttingen - Kassel - Würzburg | 34 | 34 | 0 | 2 | 5 | 0 | 5 | 1 | 4 | 0 | 0 | 1 | 2 | 0 | 21 |
| Kenzingen - Mulheim | 31 | 31 | 0 | 0 | 7 | 0 | 5 | 0 | 0 | 0 | 2 | 2 | 2 | 0 | 18 |

## 11. GREECE

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acharnes - Kiato | 75 | 75 | 11 | 10 | 4 | 0 | 5 | 4 | 4 | 4 | 0 | 1 | 2 | 0 | 45 |
| Gefyres - Pireaus | 64 | 64 | 6 | 9 | 8 | 0 | 5 | 0 | 4 | 4 | 0 | 1 | 2 | 0 | 38 |
| Plaiofarsalos - Kalambaka - Igoumenitsa | 31 | 31 | 6 | 1 | 0 | 0 | 5 | 2 | 0 | 4 | 0 | 0 | 2 | 0 | 19 |

## 12. HUNGARY

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Border HR/HU (Botovo) - Pusztaszabolcs | 72 | 72 | 11 | 4 | 1 | 7 | 5 | 1 | 4 | 4 | 2 | 1 | 2 | 1 | 43 |
| Szajol - Border RO/HU | 68 | 68 | 6 | 10 | 7 | 7 | 5 | 0 | 4 | 0 | 0 | 1 | 0 | 1 | 41 |
| Boba - Székesfehérvár | 62 | 62 | 11 | 5 | 4 | 0 | 5 | 0 | 4 | 4 | 2 | 0 | 2 | 0 | 37 |
| Szajol - Püspökladány - Debrecen - Border HU/UA (Zahony) | 55 | 55 | 6 | 7 | 0 | 7 | 5 | 1 | 4 | 0 | 2 | 1 | 0 | 1 | 33 |
| Budapest node (part 2) | 53 | 53 | 11 | 0 | 8 | 0 | 5 | 4 | 0 | 0 | 0 | 1 | 2 | 1 | 32 |
| Hatvan - Border HU/UA (Zahony) | 45 | 45 | 6 | 7 | 1 | 0 | 5 | 0 | 4 | 0 | 2 | 0 | 2 | 0 | 27 |

## 13. IRELAND

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Border UK/IE (Drogheda) - Baile Átha Cliath/Dublin | 57 | 57 | 0 | 0 | 8 | 7 | 5 | 4 | 4 | 4 | 0 | 0 | 2 | 0 | 34 |
| Baile Átha Cliath/Dublin - Corcaigh/Cork | 25 | 25 | 0 | 0 | 0 | 0 | 5 | 0 | 4 | 4 | 0 | 0 | 2 | 0 | 15 |

## 14. ITALY

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ronchi dei Legionari Sud - Villa Opicina - Border IT/SI (Sežana) | 76 | 76 | 11 | 5 | 7 | 7 | 5 | 1 | 4 | 0 | 0 | 2 | 2 | 1 | 46 |
| Settebagni - Roma | 71 | 71 | 11 | 1 | 8 | 0 | 5 | 3 | 4 | 4 | 2 | 2 | 2 | 1 | 43 |
| Border AT/IT (Brennero base tunnel) - Fortezza | 70 | 70 | 6 | 10 | 8 | 7 | 5 | 1 | 0 | 0 | 2 | 2 | 2 | 0 | 42 |
| Bologna node | 67 | 67 | 11 | 0 | 8 | 0 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 0 | 40 |
| Fortezza - Verona | 66 | 78 | 11 | 0 | 5 | 7 | 5 | 0 | 4 | 4 | 0 | 1 | 2 | 1 | 40 |
| Verona node | 66 | 66 | 11 | 0 | 8 | 0 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 0 | 40 |
| Firenze Castello - Firenze Campo di Marte | 65 | 76 | 11 | 0 | 8 | 0 | 5 | 0 | 4 | 4 | 2 | 2 | 2 | 1 | 39 |
| Border FR/IT (Modane) - Torino | 64 | 64 | 6 | 4 | 6 | 7 | 5 | 1 | 4 | 0 | 2 | 2 | 2 | 0 | 39 |
| Border AT/IT (Thoerl-Maglern) - Udine - Privano - Cervignano | 63 | 63 | 0 | 6 | 6 | 7 | 5 | 0 | 4 | 4 | 2 | 2 | 2 | 0 | 38 |
| Rho - Milano | 62 | 62 | 6 | 2 | 8 | 0 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 1 | 37 |
| Venezia node | 61 | 61 | 6 | 0 | 8 | 0 | 5 | 4 | 4 | 4 | 2 | 2 | 2 | 0 | 36 |
| Portogruaro - Venezia | 61 | 61 | 11 | 2 | 7 | 0 | 5 | 1 | 4 | 0 | 2 | 2 | 2 | 0 | 36 |
| Bologna - Ancona | 60 | 60 | 6 | 5 | 4 | 0 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 0 | 36 |
| Pisa - La Spezia | 60 | 60 | 6 | 3 | 7 | 0 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 0 | 36 |
| Padova - Bologna | 60 | 60 | 6 | 4 | 6 | 0 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 0 | 36 |
| Cuzzago - Sesto Calende | 59 | 59 | 6 | 8 | 7 | 0 | 5 | 1 | 4 | 0 | 2 | 1 | 2 | 0 | 35 |
| Border FR /IT (Modane) - Orbassano - Torino node | 58 | 58 | 6 | 0 | 6 | 7 | 5 | 1 | 0 | 4 | 2 | 2 | 2 | 0 | 35 |
| Firenze - Pisa - Livorno | 57 | 57 | 6 | 2 | 6 | 0 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 0 | 34 |
| Venezia - Padova | 53 | 53 | 6 | 3 | 7 | 0 | 5 | 1 | 4 | 0 | 2 | 2 | 2 | 0 | 32 |

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Novara - Genova | 50 | 50 | 6 | 1 | 5 | 0 | 5 | 0 | 4 | 4 | 2 | 1 | 2 | 0 | 30 |
| Tortona - Genova | 49 | 49 | 6 | 2 | 7 | 0 | 5 | 1 | 0 | 4 | 2 | 2 | 0 | 1 | 29 |
| Verona - Vicenza - Padova (HS) | 49 | 49 | 0 | 6 | 6 | 0 | 5 | 2 | 4 | 0 | 2 | 2 | 2 | 0 | 29 |
| Napoli - Bari | 48 | 48 | 6 | 2 | 2 | 0 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 0 | 29 |
| Bologna - Prato - Firenze | 47 | 47 | 0 | 6 | 6 | 0 | 5 | 1 | 4 | 0 | 2 | 2 | 2 | 0 | 28 |
| Novara - Sesto Calende - Rho | 46 | 46 | 0 | 5 | 7 | 0 | 5 | 1 | 4 | 0 | 2 | 2 | 2 | 0 | 28 |
| Napoli - Villa San Giovanni | 44 | 44 | 6 | 1 | 0 | 0 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 0 | 26 |
| Bari - Taranto | 43 | 43 | 0 | 0 | 6 | 0 | 5 | 0 | 4 | 4 | 2 | 2 | 2 | 0 | 26 |
| Castel Bolognese/Faenza - Ravenna | 43 | 43 | 0 | 1 | 7 | 0 | 5 | 0 | 4 | 4 | 0 | 2 | 2 | 0 | 26 |
| Torino - Chivasso - Novara | 42 | 42 | 0 | 2 | 6 | 0 | 5 | 2 | 4 | 0 | 2 | 2 | 2 | 0 | 25 |
| Milano - Melzo - Verona | 41 | 41 | 0 | 0 | 8 | 0 | 5 | 2 | 4 | 0 | 2 | 2 | 2 | 0 | 25 |
| Roma - Formia - Napoli | 38 | 38 | 0 | 2 | 4 | 0 | 5 | 2 | 4 | 0 | 2 | 2 | 2 | 0 | 23 |
| Firenze - Terontola - Attigliano - Settebagni | 37 | 37 | 0 | 4 | 3 | 0 | 5 | 1 | 4 | 0 | 2 | 2 | 2 | 0 | 22 |
| Venezia - Ronchi dei Legionari Sud | 37 | 37 | 6 | 0 | 6 | 0 | 5 | 0 | 0 | 0 | 2 | 2 | 2 | 0 | 22 |
| Villa San Giovanni - Palermo/Augusta | 36 | 36 | 0 | 0 | 1 | 0 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 0 | 22 |

## 15. LATVIA

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Meitene (border LT/LV) - Jegalva - Riga | 72 | 72 | 6 | 5 | 5 | 7 | 5 | 2 | 4 | 4 | 2 | 1 | 2 | 0 | 43 |
| Riga - Valka (border LV/EE) | 67 | 67 | 6 | 6 | 0 | 7 | 5 | 4 | 4 | 4 | 2 | 1 | 2 | 0 | 40 |
| Jegalva - Ventspil | 47 | 47 | 0 | 10 | 0 | 0 | 5 | 0 | 4 | 4 | 2 | 1 | 2 | 0 | 28 |
| Riga - Border LV/LT (Bauska) | 36 | 36 | 0 | 0 | 6 | 7 | 5 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 22 |
| Border EE/LV (Moisakula) - Riga | 31 | 31 | 0 | 0 | 3 | 7 | 5 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 19 |

## 16. LITHUANIA

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Palemonas – Kaunas – Border LT/PL (Mockava) (Conventional) | 64 | 64 | 6 | 3 | 5 | 7 | 5 | 1 | 4 | 4 | 0 | 2 | 2 | 0 | 38 |
| Palemonas – State border (border LT/LV) | 64 | 64 | 6 | 8 | 0 | 7 | 5 | 1 | 4 | 4 | 0 | 2 | 2 | 0 | 38 |
| Palemonas – Vilnius | 57 | 57 | 0 | 10 | 7 | 0 | 5 | 4 | 4 | 0 | 0 | 2 | 2 | 0 | 34 |
| Kaunas – Border LT/PL (Mockava) (High speed) | 43 | 43 | 0 | 0 | 8 | 7 | 5 | 0 | 0 | 0 | 2 | 2 | 2 | 0 | 26 |
| Klaipeda -Siauliai | 43 | 43 | 0 | 9 | 3 | 0 | 5 | 1 | 4 | 0 | 0 | 2 | 2 | 0 | 26 |
| Border LV/LT (Bauska) – Palemonas | 29 | 29 | 0 | 0 | 2 | 7 | 5 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 18 |

## 17. LUXEMBOURG

Luxemburg has an ETCS deployment without any gaps in the CNC. No lines to be prioritised.

## 18. NETHERLANDS

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Meteren – Utrecht | 80 | 80 | 11 | 8 | 7 | 0 | 5 | 3 | 4 | 4 | 2 | 2 | 2 | 0 | 48 |
| Utrecht – Gouda – Rotterdam | 75 | 75 | 11 | 6 | 5 | 0 | 5 | 3 | 4 | 4 | 2 | 2 | 2 | 0 | 45 |
| Border DE/NL (German border II) – Utrecht node | 64 | 64 | 6 | 6 | 0 | 7 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 0 | 39 |
| Amsterdam – Schipol | 62 | 62 | 6 | 5 | 7 | 0 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 0 | 37 |
| Rotterdam | 62 | 62 | 0 | 10 | 8 | 0 | 5 | 4 | 4 | 0 | 2 | 2 | 2 | 0 | 37 |
| Utrecht node – Zevenaar | 58 | 58 | 11 | 3 | 5 | 0 | 5 | 2 | 4 | 0 | 2 | 2 | 2 | 0 | 35 |
| Vlissingen – Roosendal | 53 | 53 | 6 | 4 | 3 | 0 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 0 | 32 |

## 19. POLAND

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Most Wisla – Border PL/CZ (Zebrzydowice) | 81 | 81 | 6 | 10 | 8 | 7 | 5 | 0 | 4 | 4 | 2 | 1 | 2 | 0 | 48 |
| Opole – Kedzierzyn Kozle – Border PL/CZ (Bohumin) | 79 | 79 | 11 | 6 | 7 | 7 | 5 | 0 | 4 | 4 | 0 | 1 | 2 | 0 | 47 |
| Border LT/PL (Mockava) – Warszawa | 74 | 74 | 11 | 1 | 7 | 7 | 5 | 0 | 4 | 4 | 2 | 1 | 2 | 0 | 44 |

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Warszawa | 73 | 73 | 11 | 2 | 8 | 0 | 5 | 4 | 4 | 4 | 2 | 2 | 2 | 0 | 44 |
| Wroclaw | 67 | 67 | 11 | 0 | 8 | 0 | 5 | 2 | 4 | 4 | 2 | 2 | 2 | 0 | 40 |
| Most Wisla – Zawiercie | 57 | 57 | 6 | 2 | 7 | 0 | 5 | 2 | 4 | 4 | 2 | 1 | 2 | 0 | 34 |
| Opole (Groszowice)-Katowice | 56 | 56 | 6 | 3 | 7 | 0 | 5 | 0 | 4 | 4 | 2 | 1 | 2 | 0 | 33 |
| Poznan (Kiekrz – Lubon Koto Poznania) | 54 | 54 | 6 | 6 | 8 | 0 | 5 | 0 | 4 | 0 | 2 | 1 | 0 | 1 | 33 |
| Tczew – Rudziniec Gliwick | 53 | 53 | 6 | 8 | 0 | 0 | 5 | 0 | 4 | 4 | 2 | 1 | 2 | 0 | 32 |
| Most Wisla – Border PL/SK (Zywiec) | 51 | 51 | 0 | 0 | 7 | 7 | 5 | 1 | 4 | 4 | 0 | 1 | 2 | 0 | 31 |
| Poznan-Swinousjscie | 49 | 49 | 6 | 4 | 3 | 0 | 5 | 1 | 4 | 4 | 0 | 1 | 2 | 0 | 29 |
| Szeligi – Łódź | 37 | 37 | 6 | 0 | 7 | 0 | 5 | 0 | 0 | 0 | 2 | 1 | 2 | 0 | 22 |
| Opole – Wroclaw | 37 | 37 | 0 | 3 | 7 | 0 | 5 | 0 | 4 | 0 | 0 | 1 | 2 | 0 | 22 |
| Łódź – Poznań | 31 | 31 | 6 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 18 |

## 20. PORTUGAL

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pampilhosa – Aveiro | 70 | 70 | 6 | 10 | 8 | 0 | 5 | 2 | 4 | 4 | 2 | 0 | 2 | 0 | 42 |
| Lisboa – Coimbra – Pampilhosa | 58 | 58 | 6 | 7 | 2 | 0 | 5 | 4 | 4 | 4 | 2 | 0 | 2 | 0 | 35 |
| Poceirão – Sines | 56 | 56 | 6 | 10 | 5 | 0 | 5 | 0 | 0 | 4 | 2 | 0 | 2 | 0 | 34 |
| Aveiro – Contumil – Leixões/Porto | 55 | 55 | 0 | 7 | 7 | 0 | 5 | 2 | 4 | 4 | 2 | 0 | 2 | 0 | 33 |
| Poceirão – Lisboa | 42 | 42 | 6 | 0 | 6 | 0 | 5 | 0 | 0 | 4 | 2 | 0 | 2 | 1 | 25 |

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Evora – Poceirão – Pinhal Novo – Lisboa – Porto de Lisboa | 42 | 42 | 0 | 4 | 4 | 0 | 5 | 2 | 4 | 4 | 0 | 1 | 2 | 0 | 25 |
| Aveiro – Porto (Contumil) | 34 | 34 | 0 | 0 | 8 | 0 | 5 | 0 | 0 | 4 | 2 | 0 | 2 | 0 | 21 |
| Border ES/PT (Medina del campo) – Aveiro | 34 | 40 | 0 | 0 | 4 | 7 | 5 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 20 |
| Aveiro – Lisboa | 26 | 26 | 0 | 0 | 3 | 0 | 5 | 0 | 0 | 4 | 2 | 0 | 2 | 0 | 16 |

## 21. ROMANIA

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Craiova – București | 70 | 70 | 6 | 10 | 6 | 0 | 5 | 4 | 4 | 4 | 2 | 0 | 2 | 0 | 42 |
| Brașov – Brazi | 69 | 69 | 6 | 8 | 7 | 0 | 5 | 4 | 4 | 4 | 2 | 0 | 2 | 0 | 41 |
| Arad – Craiova | 64 | 64 | 6 | 9 | 4 | 0 | 5 | 3 | 4 | 4 | 2 | 0 | 2 | 0 | 39 |
| Craiova – Calafat | 60 | 60 | 6 | 6 | 8 | 0 | 5 | 0 | 4 | 4 | 2 | 0 | 2 | 0 | 36 |
| București – Constanța | 35 | 35 | 6 | 0 | 6 | 0 | 5 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 21 |

## 22. SLOVAKIA

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bratislava – Border SK/AT (Petrzalka) | 79 | 79 | 6 | 10 | 8 | 7 | 5 | 0 | 4 | 4 | 2 | 2 | 0 | 0 | 47 |

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Border CZ/SK (Lanzhot) – Devínska Nová Ves | 74 | 74 | 6 | 7 | 7 | 7 | 5 | 3 | 4 | 4 | 2 | 0 | 0 | 0 | 44 |
| Bratislava – Border AT/SK (Devínska Nová Ves) | 73 | 73 | 6 | 6 | 8 | 7 | 5 | 4 | 4 | 0 | 2 | 2 | 0 | 0 | 44 |
| Border CZ/SK (Mosty u Jablunkova) – Čadca | 72 | 72 | 6 | 6 | 8 | 7 | 5 | 2 | 4 | 4 | 2 | 0 | 0 | 0 | 43 |
| Petrzalka – Border HU/SK (Petrzalka/Rajka) | 68 | 68 | 6 | 3 | 8 | 7 | 5 | 0 | 4 | 4 | 2 | 2 | 0 | 0 | 41 |
| Žilina – Border SK/UA (Cop) | 62 | 62 | 6 | 7 | 0 | 7 | 5 | 3 | 4 | 4 | 2 | 0 | 0 | 0 | 37 |
| Border PL/SK (Zywiec) – Čadca | 60 | 60 | 6 | 0 | 8 | 7 | 5 | 1 | 4 | 4 | 2 | 0 | 0 | 0 | 36 |
| Žilina node | 59 | 59 | 11 | 1 | 8 | 0 | 5 | 0 | 4 | 4 | 2 | 0 | 0 | 1 | 36 |
| Border CZ/SK (Hranice/Púchov) – Púchov | 54 | 63 | 0 | 1 | 8 | 7 | 5 | 1 | 4 | 4 | 2 | 0 | 0 | 0 | 32 |

## 23. SLOVENIA

| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Border IT/SI (Sežana) – Divača | 46 | 46 | 6 | 0 | 8 | 7 | 5 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 28 |
| Divača – Ljubljana | 37 | 37 | 11 | 0 | 0 | 0 | 5 | 0 | 0 | 4 | 0 | 2 | 0 | 0 | 22 |

## 24. SPAIN

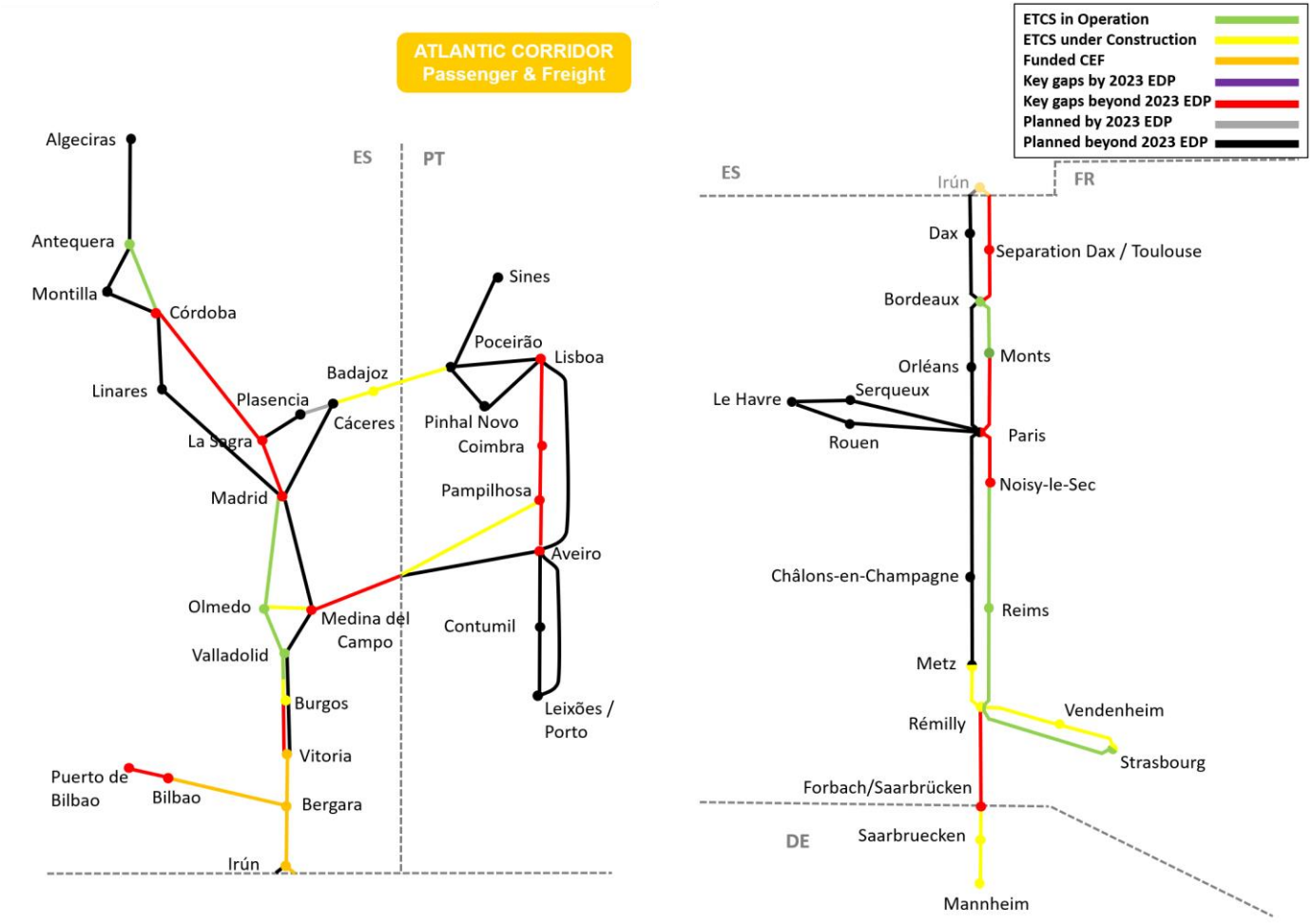
| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Medina del Campo - Border ES/PT (Aveiro) | 66 | 66 | 11 | 3 | 5 | 7 | 5 | 0 | 4 | 4 | 0 | 0 | 0 | 0 | 40 |
| Burgos - Vitoria (High speed) | 61 | 61 | 11 | 0 | 8 | 7 | 5 | 0 | 0 | 4 | 2 | 0 | 0 | 0 | 37 |
| Bergara - Irún (Border ES/FR) | 58 | 58 | 0 | 6 | 8 | 7 | 5 | 4 | 4 | 0 | 0 | 0 | 0 | 1 | 35 |
| Córdoba - La Sagra - Madrid | 58 | 58 | 11 | 0 | 3 | 0 | 5 | 3 | 4 | 4 | 2 | 2 | 0 | 0 | 35 |
| Bilbao - Puerto de Bilbao | 55 | 55 | 6 | 7 | 8 | 0 | 5 | 0 | 4 | 4 | 0 | 0 | 0 | 0 | 33 |
| Madrid - Vitoria | 54 | 54 | 11 | 10 | 1 | 0 | 5 | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 32 |
| Madrid - Casetas - Zaragoza - Tarragona | 42 | 42 | 6 | 8 | 1 | 0 | 5 | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 25 |
| Sevilla - Peñaflor - Córdoba | 51 | 51 | 6 | 4 | 6 | 0 | 5 | 2 | 4 | 4 | 0 | 0 | 0 | 0 | 31 |
| La Llagosta - Nudo Mollet - Castellbisball | 50 | 58 | 11 | 0 | 8 | 0 | 5 | 0 | 4 | 0 | 0 | 1 | 0 | 1 | 30 |
| Barcelona - Border ES/FR (Portbou) | 49 | 49 | 0 | 6 | 6 | 7 | 5 | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 30 |
| Sevilla - Córdoba | 49 | 52 | 6 | 0 | 7 | 0 | 5 | 0 | 4 | 4 | 2 | 2 | 0 | 0 | 29 |
| Córdoba - Montilla - Antequera (Fuente de Piedra) | 47 | 47 | 11 | 2 | 7 | 0 | 5 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 28 |
| Tarragona - Castellbisbal - Barcelona | 47 | 55 | 11 | 0 | 7 | 0 | 5 | 0 | 4 | 0 | 0 | 0 | 0 | 1 | 28 |
| Cartagena - Murcia | 43 | 54 | 6 | 0 | 7 | 0 | 5 | 0 | 4 | 4 | 0 | 0 | 0 | 0 | 26 |
| Algeciras - Antequera (Bobadilla) | 43 | 43 | 6 | 1 | 6 | 0 | 5 | 0 | 4 | 4 | 0 | 0 | 0 | 0 | 26 |
| Córdoba - Linares - Madrid | 41 | 41 | 0 | 8 | 2 | 0 | 5 | 2 | 4 | 4 | 0 | 0 | 0 | 0 | 24 |
| Granada - Murcia | 40 | 40 | 11 | 0 | 3 | 0 | 5 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 24 |
| Sevilla - Antequera (Bobadilla) | 37 | 37 | 0 | 0 | 6 | 0 | 5 | 2 | 4 | 4 | 0 | 1 | 0 | 0 | 22 |

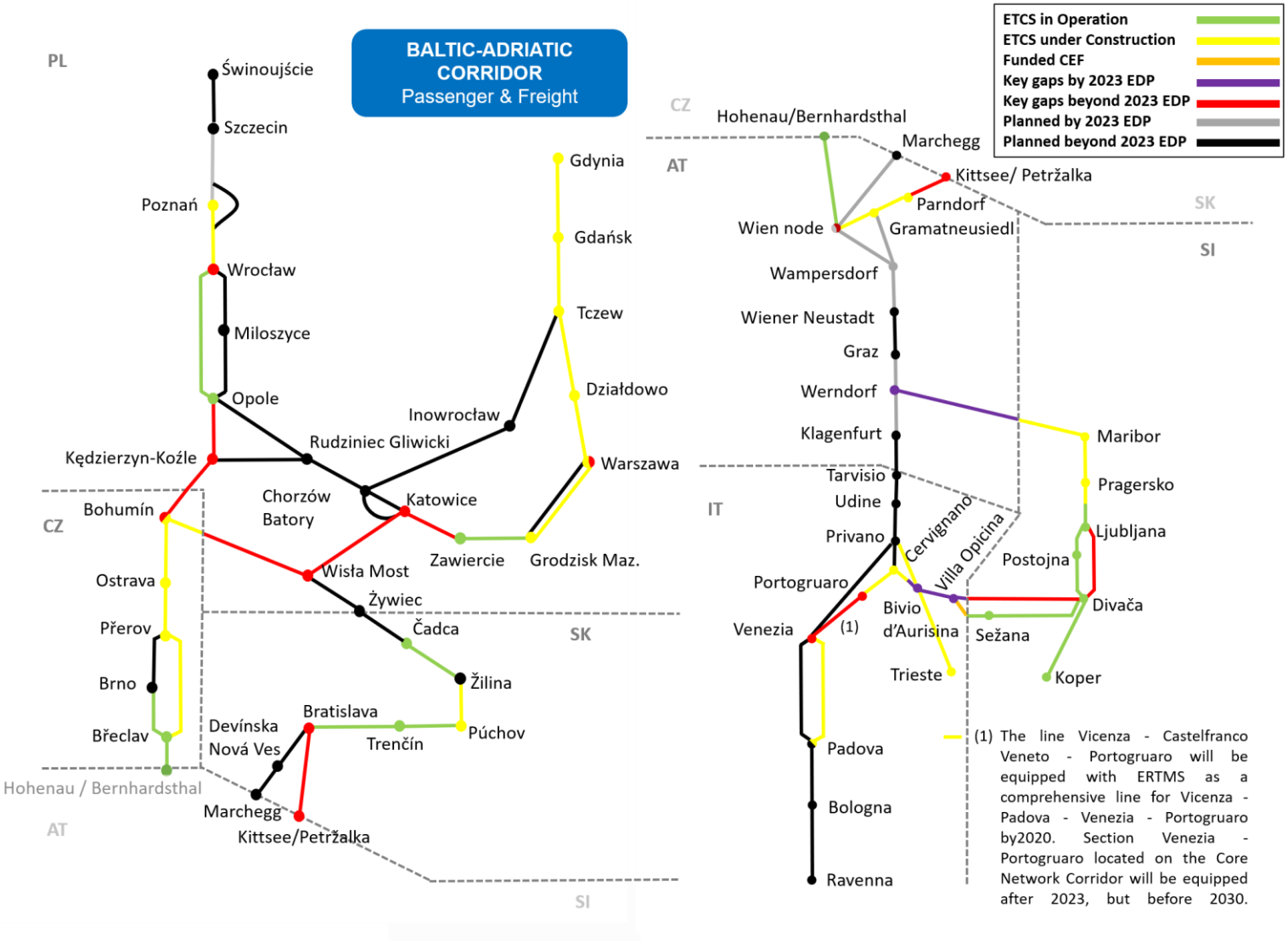
| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Madrid - La Sagra - Cáceres | 30 | 30 | 6 | 0 | 0 | 0 | 5 | 1 | 0 | 4 | 2 | 0 | 0 | 0 | 18 |

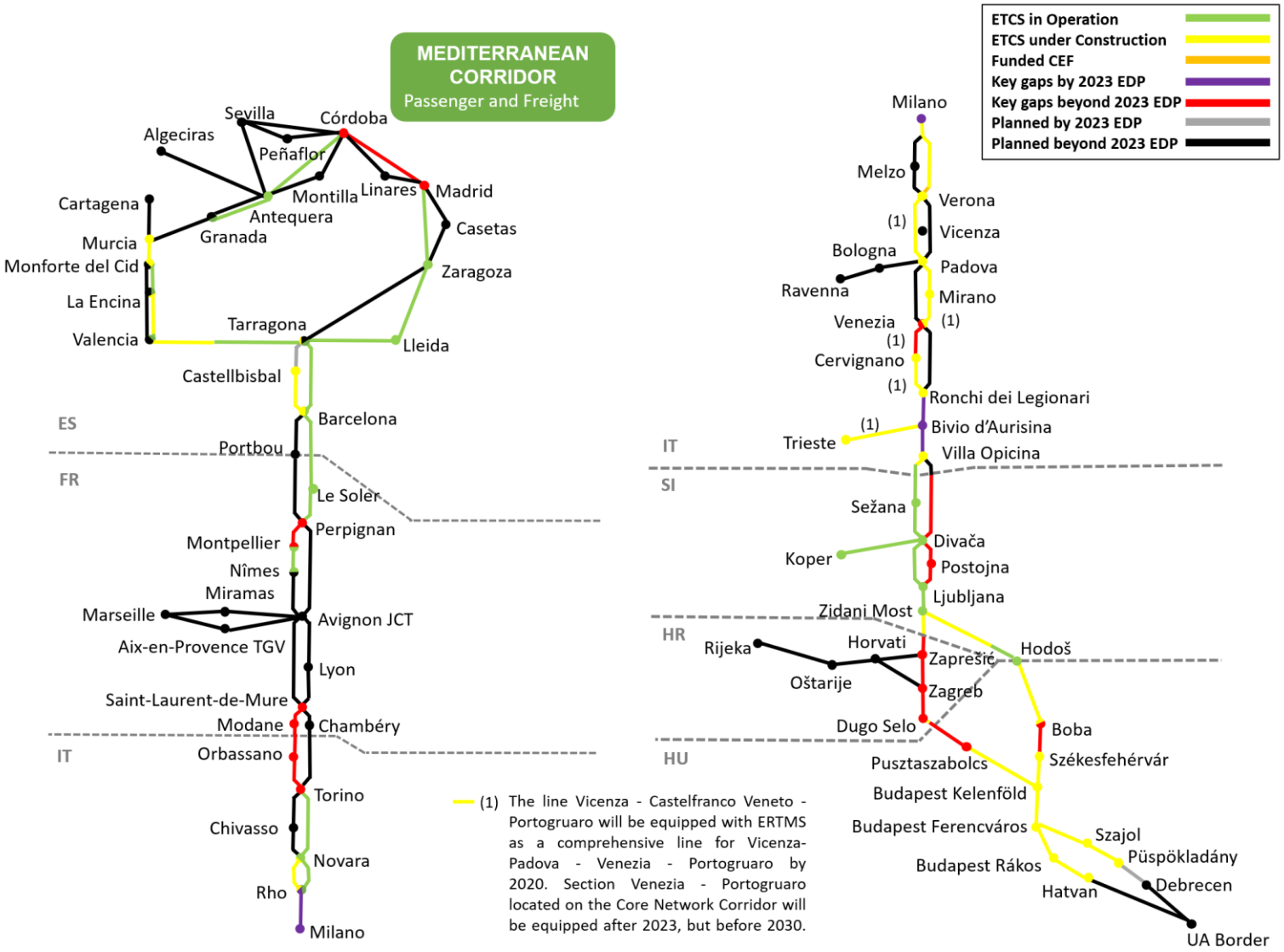
## 25. SWEDEN

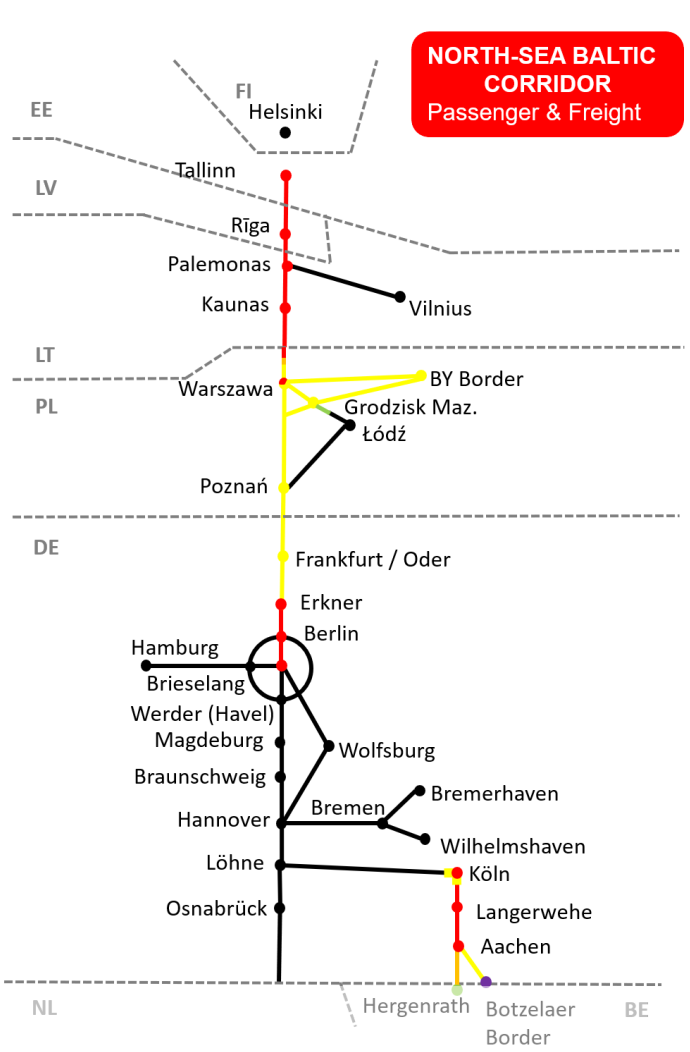
| Lines | % Method 1 | % Method 2 | Localization of the gap in terms of the ETCS deployment | Freight traffic | Length of the gap | Location of the gap in the CNC | Infill device | Passenger traffic | Status of the line | No alternative routes | ETCS level | GSM-R status | ETCS baseline | MS criteria | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lund - Malmö | 68 | 68 | 0 | 10 | 8 | 0 | 5 | 4 | 4 | 4 | 2 | 2 | 2 | 0 | 41 |
| Border NO/SE (Kornsjø) - Göteborg | 66 | 66 | 6 | 4 | 4 | 7 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 0 | 40 |
| Malmö - Border SE/DK (Malmö) | 64 | 64 | 0 | 0 | 8 | 7 | 5 | 4 | 4 | 4 | 2 | 2 | 2 | 1 | 39 |
| Malmö - Trelleborg | 53 | 53 | 0 | 4 | 7 | 0 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 0 | 32 |
| Åby - Linköping - Mjölby | 51 | 51 | 0 | 5 | 6 | 0 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 0 | 31 |
| Stockholm Älvsjo - Järna | 49 | 49 | 0 | 3 | 7 | 0 | 5 | 0 | 4 | 4 | 2 | 2 | 2 | 0 | 30 |
| Mjölby - Malmö | 46 | 46 | 0 | 8 | 0 | 0 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 0 | 28 |
| Stockholm - Stockholm Älvsjo | 46 | 46 | 0 | 1 | 8 | 0 | 5 | 0 | 4 | 4 | 2 | 2 | 2 | 0 | 28 |
| Ängelholm - Helsinborg - Kävlinge - Lund | 44 | 44 | 0 | 0 | 6 | 0 | 5 | 1 | 4 | 4 | 2 | 2 | 2 | 0 | 27 |
| Järna - Hallsberg - Mjölby | 43 | 43 | 0 | 4 | 2 | 0 | 5 | 0 | 4 | 4 | 2 | 2 | 2 | 0 | 26 |
| Järna - Åby | 41 | 41 | 0 | 0 | 6 | 0 | 5 | 0 | 4 | 4 | 2 | 2 | 2 | 0 | 25 |
| Göteborg - Ängelholm - Kävinge - Burlöv | 41 | 41 | 0 | 3 | 1 | 0 | 5 | 0 | 4 | 4 | 2 | 2 | 2 | 0 | 24 |
| Stockholm - Järna - Åby - Linköping | 33 | 33 | 0 | 0 | 4 | 0 | 5 | 1 | 0 | 4 | 2 | 2 | 2 | 0 | 20 |

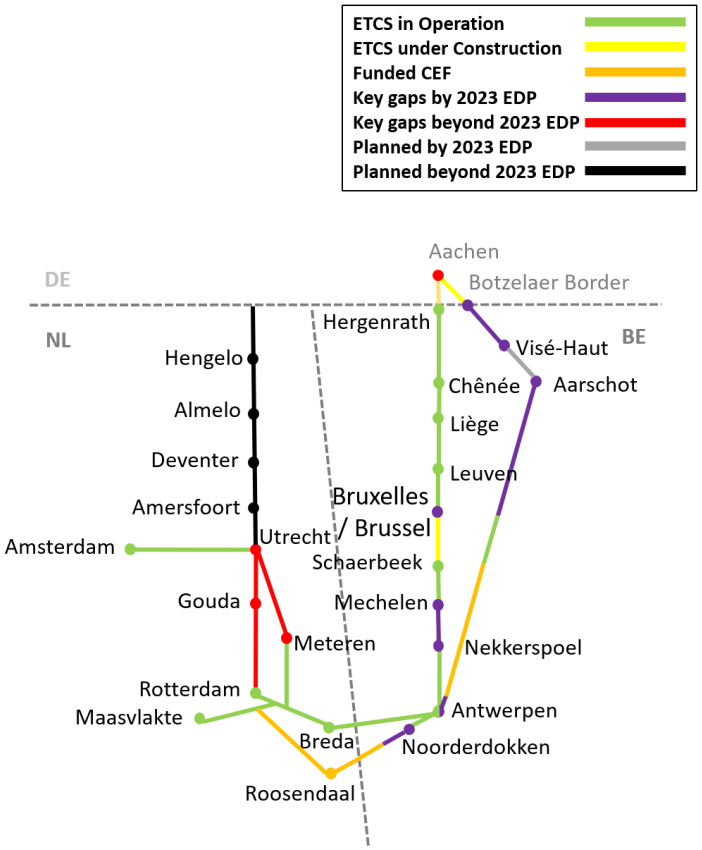
## ANNEX C: CORE NETWORK CORRIDOR SKETCHES

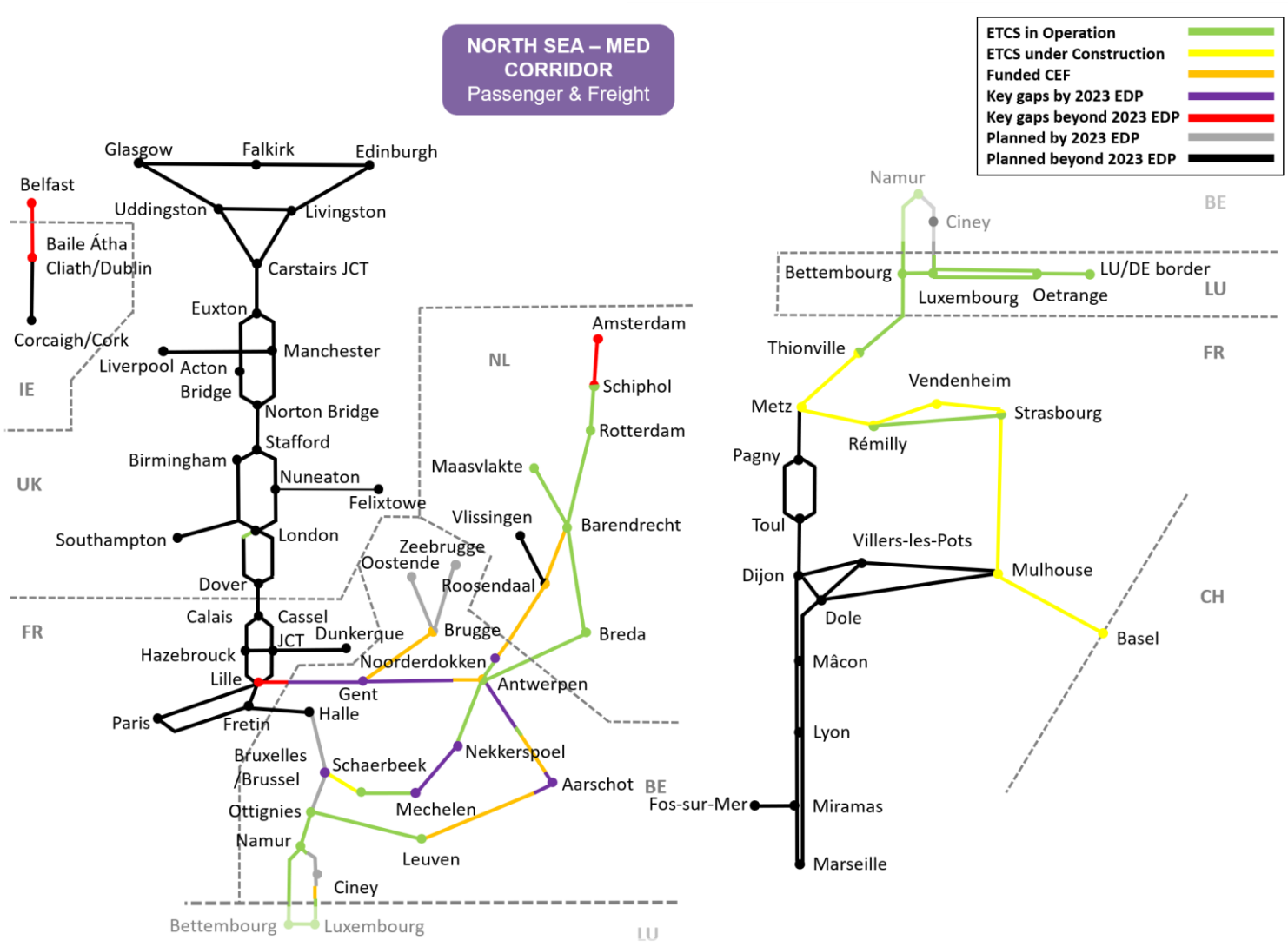


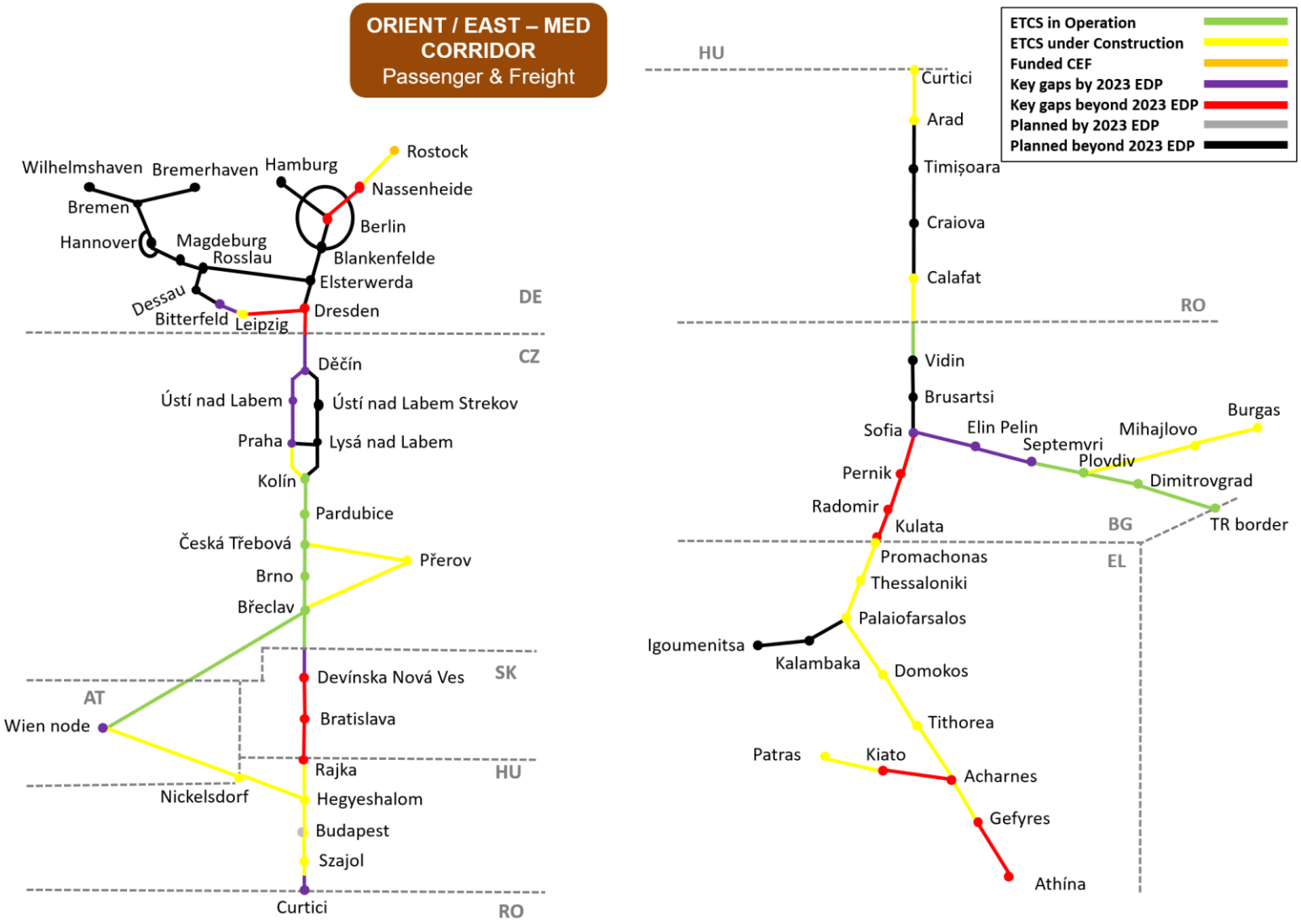

BALTIC-ADRIATIC CORRIDOR
Passenger & Freight
ETCS in Operation
ETCS under Construction
Funded CEF
Key gaps by 2023 EDP
Key gaps beyond 2023 EDP
Planned by 2023 EDP
Planned beyond 2023 EDP
PL
Świnoujście
Szczecin
Poznań
Wrocław
Miloszyce
Opole
Kędzierzyn-Koźle
Bohumín
CZ
Ostrava
Přerov
Brno
Břeclav
Hohenau / Bernhardsthal
AT
Gdynia
Gdańsk
Tczew
Działdowo
Warszawa
Inowrocław
Rudziniec Gliwicki
Chorzów Batory
Katowice
Zawiercie
Grodzisk Maz.
Wisła Most
Żywiec
Čadca
Žilina
Púchov
Trenčín
Bratislava
Devínska Nová Ves
Marchegg
Kittsee/Petržalka
SK
SI
CZ
Hohenau/Bernhardsthal
AT
Marchegg
Kittsee/ Petržalka
Parndorf
Gramatneusiedl
Wien node
Wampersdorf
Wiener Neustadt
Graz
Werndorf
Klagenfurt
Tarvisio
Udine
Privano
IT
Cervignano
Villa Opicina
Portogruaro
Venezia
(1)
Bivio d'Aurisina
Trieste
Padova
Bologna
Ravenna
Maribor
Pragersko
Ljubljana
Postojna
Divača
Sežana
Koper
SK
SI
(1) The line Vicenza - Castelfranco Veneto - Portogruaro will be equipped with ERTMS as a comprehensive line for Vicenza - Padova - Venezia - Portogruaro by2020. Section Venezia - Portogruaro located on the Core Network Corridor will be equipped after 2023, but before 2030.

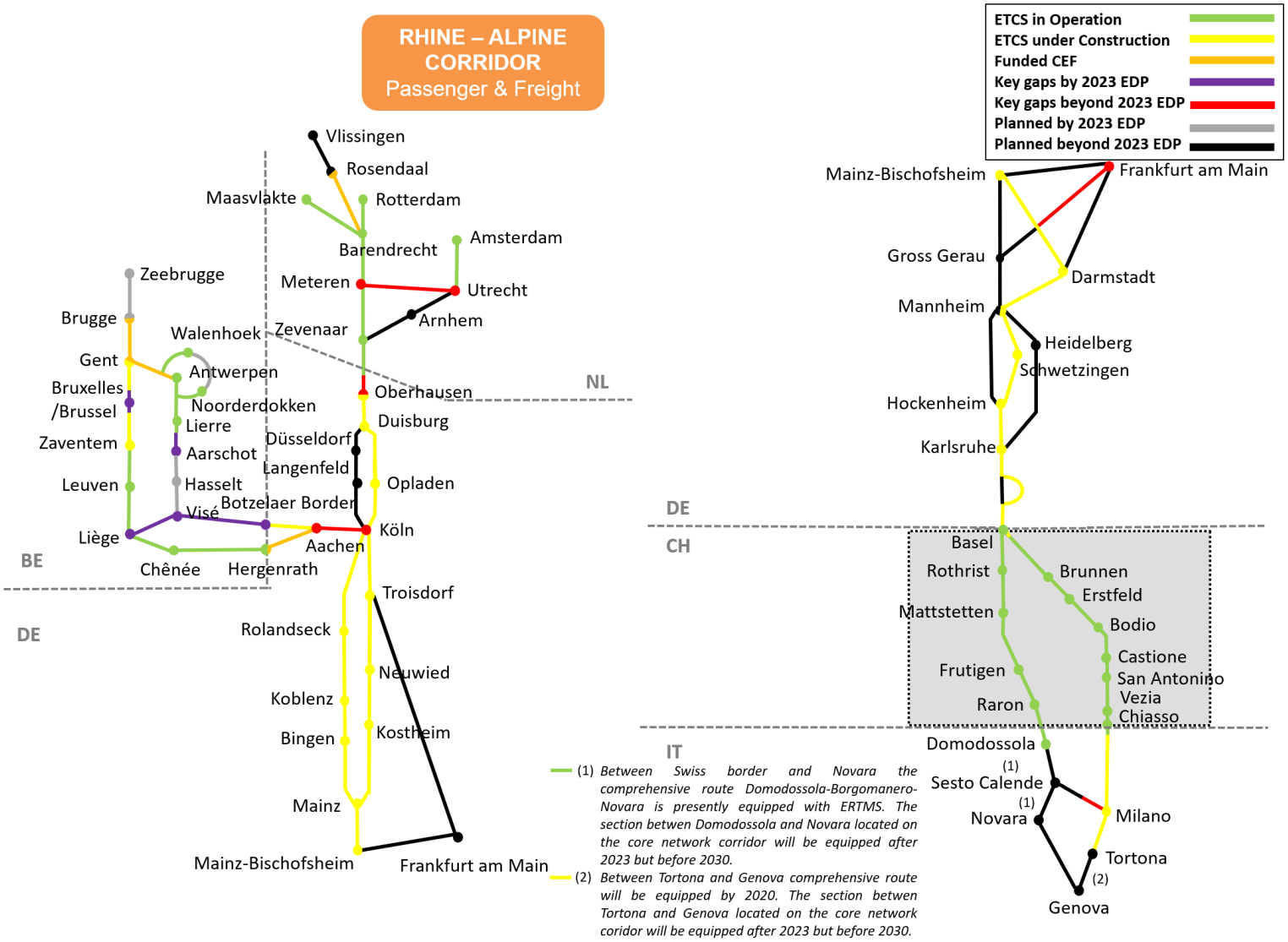

MEDITERRANEAN CORRIDOR
Passenger and Freight
ETCS in Operation
ETCS under Construction
Funded CEF
Key gaps by 2023 EDP
Key gaps beyond 2023 EDP
Planned by 2023 EDP
Planned beyond 2023 EDP
Sevilla
Córdoba
Algeciras
Peñaflor
Cartagena
Montilla
Linares
Madrid
Antequera
Casetas
Murcia
Granada
Monforte del Cid
Zaragoza
La Encina
Tarragona
Valencia
Lleida
Castellbisbal
ES
Barcelona
Portbou
FR
Le Soler
Perpignan
Montpellier
Nîmes
Miramas
Marseille
Avignon JCT
Aix-en-Provence TGV
Lyon
Saint-Laurent-de-Mure
Modane
Chambéry
IT
Orbassano
Torino
Chivasso
Novara
Rho
Milano
(1) The line Vicenza - Castelfranco Veneto - Portogruaro will be equipped with ERTMS as a comprehensive line for Vicenza-Padova - Venezia - Portogruaro by 2020. Section Venezia - Portogruaro located on the Core Network Corridor will be equipped after 2023, but before 2030.
Milano
Melzo
Verona
(1)
Vicenza
Bologna
Padova
Ravenna
Mirano
Venezia
(1)
(1)
Cervignano
(1)
Ronchi dei Legionari
(1)
Bivio d'Aurisina
Trieste
IT
Villa Opicina
SI
Sežana
Divača
Koper
Postojna
Ljubljana
Zidani Most
HR
Rijeka
Horvati
Hodoš
Zapresić
Oštarije
Zagreb
Dugo Selo
Boba
Pusztaszabolcs
Székesfehérvár
HU
Budapest Kelenföld
Budapest Ferencváros
Szajol
Püspökladány
Budapest Rákos
Hatvan
Debrecen
UA Border

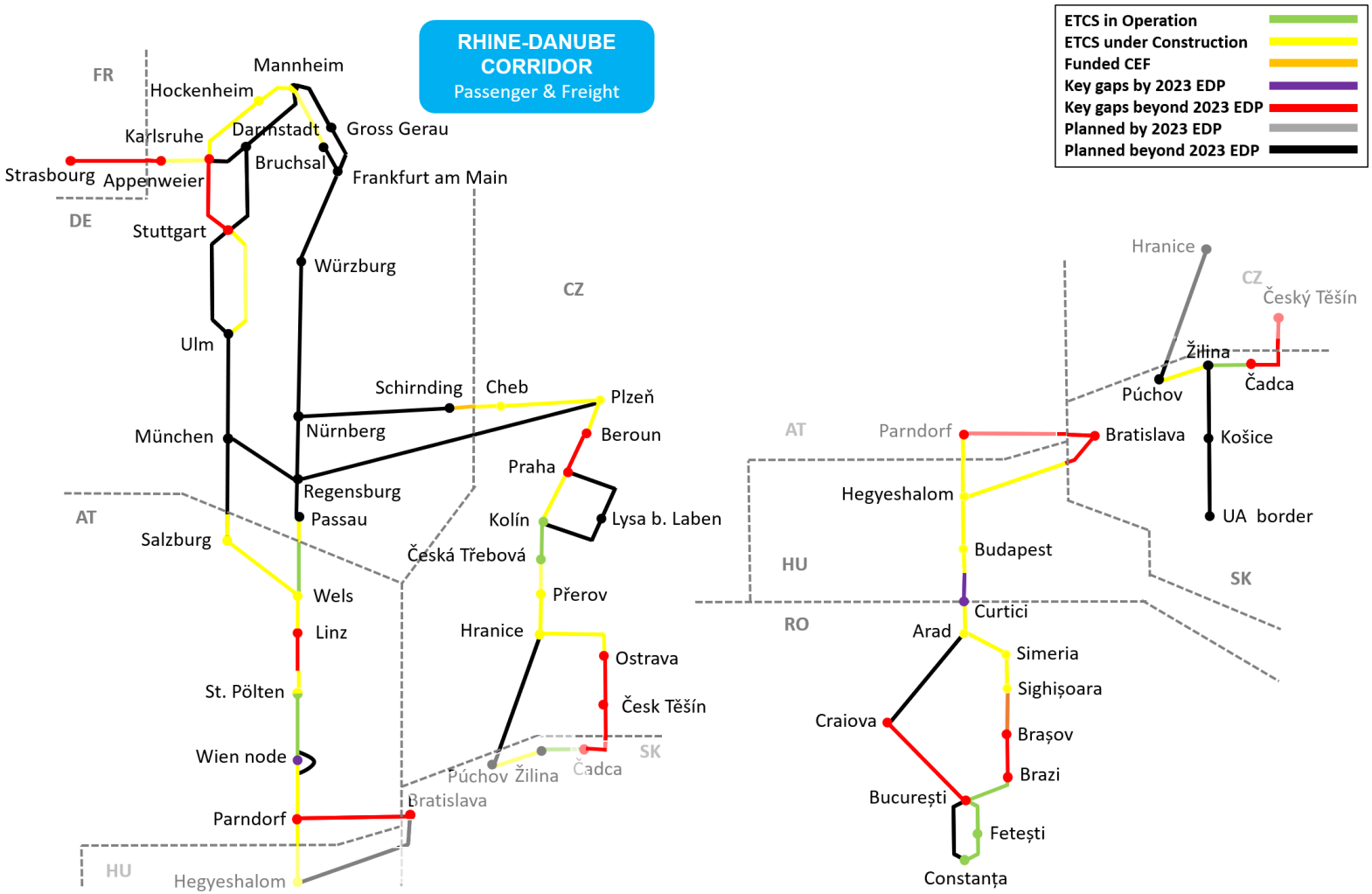

NORTH-SEA BALTIC CORRIDOR
Passenger & Freight
EE
FI
Helsinki
Tallinn
LV
Rīga
Palemonas
Kaunas
Vilnius
LT
PL
Warszawa
BY Border
Grodzisk Maz.
Łódź
Poznań
DE
Frankfurt / Oder
Erkner
Berlin
Hamburg
Brieselang
Werder (Havel)
Magdeburg
Wolfsburg
Braunschweig
Bremerhaven
Hannover
Bremen
Wilhelmshaven
Löhne
Köln
Osnabrück
Langerwehe
Aachen
NL
Hergenrath
Botzelaer Border
BE

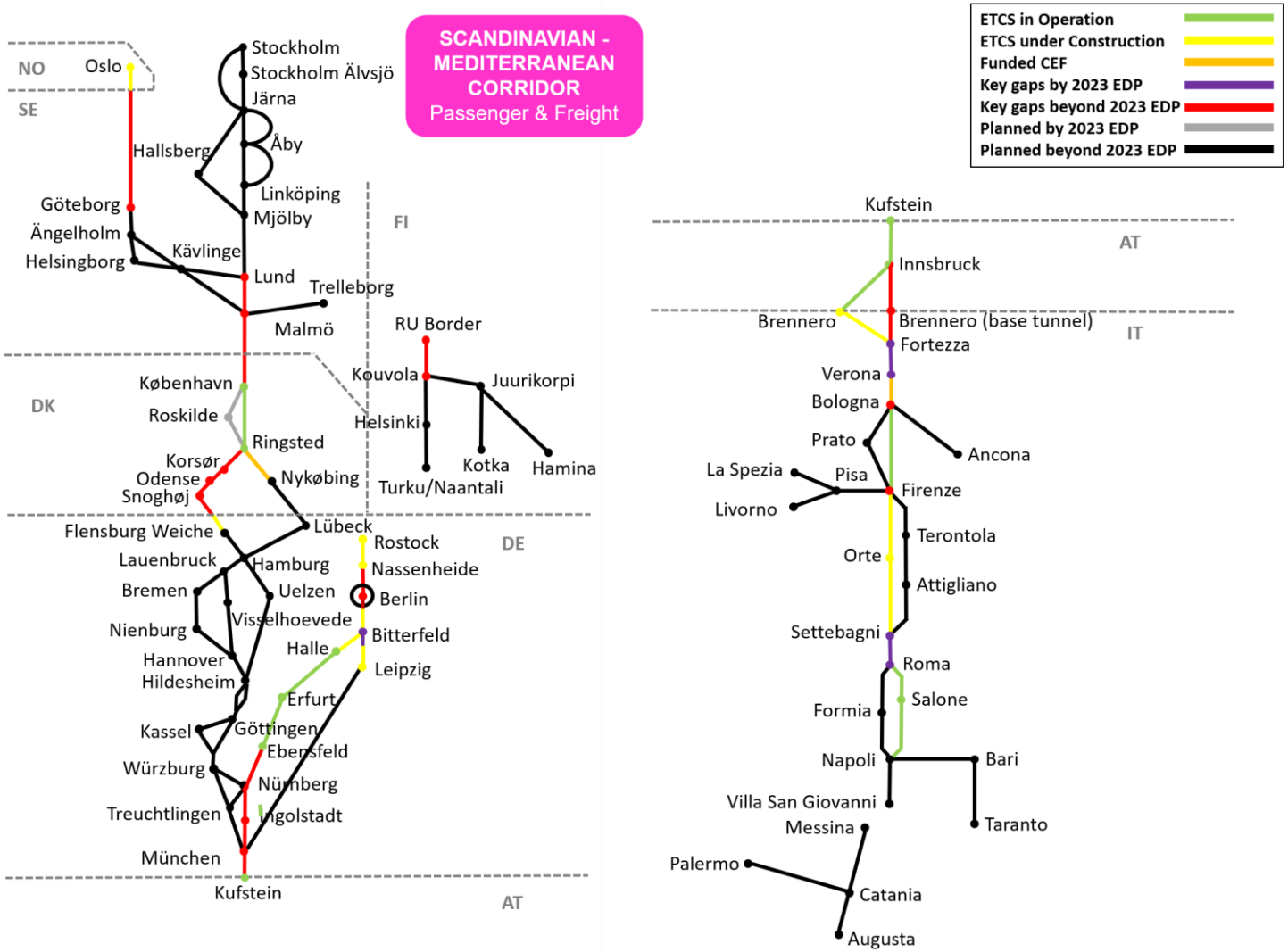

ETCS in Operation
ETCS under Construction
Funded CEF
Key gaps by 2023 EDP
Key gaps beyond 2023 EDP
Planned by 2023 EDP
Planned beyond 2023 EDP
Aachen
DE
Botzelaer Border
NL
Hergenrath
BE
Visé-Haut
Hengelo
Chênée
Aarschot
Almelo
Liège
Deventer
Leuven
Amersfoort
Bruxelles / Brussel
Amsterdam
Utrecht
Schaerbeek
Gouda
Mechelen
Meteren
Nekkerspoel
Rotterdam
Antwerpen
Maasvlakte
Breda
Noorderdokken
Roosendaal


NORTH SEA – MED CORRIDOR
Passenger & Freight
ETCS in Operation
ETCS under Construction
Funded CEF
Key gaps by 2023 EDP
Key gaps beyond 2023 EDP
Planned by 2023 EDP
Planned beyond 2023 EDP
Glasgow
Falkirk
Edinburgh
Belfast
Uddingston
Livingston
Baile Átha Cliath/Dublin
Carstairs JCT
Euxton
Corcaigh/Cork
Manchester
Liverpool
Acton Bridge
IE
Norton Bridge
Stafford
Birmingham
Nuneaton
UK
Felixtowe
Southampton
London
Dover
Calais
Cassel
JCT
Dunkerque
FR
Hazebrouck
Lille
Paris
Fretin
Halle
Gent
Bruxelles /Brussel
Schaerbeek
Ottignies
Namur
Ciney
Bettembourg
Luxembourg
LU
Mechelen
Leuven
Aarschot
BE
Nekkerspoel
Antwerpen
Amsterdam
Schiphol
NL
Rotterdam
Maasvlakte
Barendrecht
Vlissingen
Zeebrugge
Oostende
Roosendaal
Brugge
Breda
Noorderdokken
Namur
Ciney
BE
Bettembourg
LU/DE border
Luxembourg
Oetrange
LU
Thionville
FR
Vendenheim
Metz
Strasbourg
Rémilly
Pagny
Toul
Villers-les-Pots
Dijon
Mulhouse
Dole
Basel
CH
Mâcon
Lyon
Fos-sur-Mer
Miramas
Marseille


ORIENT / EAST – MED CORRIDOR
Passenger & Freight
ETCS in Operation
ETCS under Construction
Funded CEF
Key gaps by 2023 EDP
Key gaps beyond 2023 EDP
Planned by 2023 EDP
Planned beyond 2023 EDP
Wilhelmshaven
Bremerhaven
Hamburg
Rostock
Nassenheide
Bremen
Berlin
Hannover
Magdeburg
Rosslau
Blankenfelde
Elsterwerda
Dessau
Bitterfeld
Leipzig
Dresden
DE
CZ
Děčín
Ústí nad Labem
Ústí nad Labem Strekov
Praha
Lysá nad Labem
Kolín
Pardubice
Česká Třebová
Přerov
Brno
Břeclav
Devínska Nová Ves
SK
AT
Wien node
Bratislava
Rajka
HU
Nickelsdorf
Hegyeshalom
Budapest
Szajol
Curtici
RO
HU
Curtici
Arad
Timişoara
Craiova
Calafat
RO
Vidin
Brusartsi
Sofia
Elin Pelin
Septemvri
Mihajlovo
Burgas
Plovdiv
Pernik
Dimitrovgrad
Radomir
Kulata
TR border
BG
Promachonas
EL
Thessaloniki
Palaiofarsalos
Igoumenitsa
Kalambaka
Domokos
Tithorea
Patras
Kiato
Acharnes
Gefyres
Athína


RHINE – ALPINE CORRIDOR
Passenger & Freight
ETCS in Operation
ETCS under Construction
Funded CEF
Key gaps by 2023 EDP
Key gaps beyond 2023 EDP
Planned by 2023 EDP
Planned beyond 2023 EDP
Vlissingen
Rosendaal
Maasvlakte
Rotterdam
Barendrecht
Amsterdam
Zeebrugge
Meteren
Utrecht
Brugge
Arnhem
Walenhoek
Zevenaar
Gent
Antwerpen
Bruxelles /Brussel
Oberhausen
NL
Noorderdokken
Lierre
Duisburg
Zaventem
Düsseldorf
Aarschot
Langenfeld
Leuven
Opladen
Hasselt
Botzelaer Border
Visé
Köln
Liège
Aachen
BE
Chênée
Hergenrath
Troisdorf
DE
Rolandseck
Neuwied
Koblenz
Bingen
Kostheim
Mainz
Mainz-Bischofsheim
Frankfurt am Main
Gross Gerau
Darmstadt
Mannheim
Heidelberg
Schwetzingen
Hockenheim
Karlsruhe
DE
CH
Basel
Rothrist
Brunnen
Erstfeld
Mattstetten
Bodio
Castione
Frutigen
San Antonino
Vezia
Raron
Chiasso
IT
Domodossola
(1)
Sesto Calende
(1)
Novara
Milano
Tortona
(2)
Genova
(1) Between Swiss border and Novara the comprehensive route Domodossola-Borgomanero-Novara is presently equipped with ERTMS. The section betwen Domodossola and Novara located on the core network corridor will be equipped after 2023 but before 2030.
(2) Between Tortona and Genova comprehensive route will be equipped by 2020. The section betwen Tortona and Genova located on the core network coridor will be equipped after 2023 but before 2030.


RHINE-DANUBE CORRIDOR
Passenger & Freight
ETCS in Operation
ETCS under Construction
Funded CEF
Key gaps by 2023 EDP
Key gaps beyond 2023 EDP
Planned by 2023 EDP
Planned beyond 2023 EDP
FR
DE
AT
CZ
HU
SK
RO
Strasbourg
Appenweier
Karlsruhe
Hockenheim
Mannheim
Darmstadt
Gross Gerau
Bruchsal
Frankfurt am Main
Stuttgart
Würzburg
Ulm
München
Nürnberg
Schirnding
Cheb
Plzeň
Beroun
Praha
Regensburg
Passau
Salzburg
Kolín
Lysa b. Laben
Česká Třebová
Přerov
Hranice
Ostrava
Česk Těšín
Wels
Linz
St. Pölten
Wien node
Parndorf
Bratislava
Púchov
Žilina
Čadca
Hegyeshalom
Hranice
Český Těšín
Žilina
Čadca
Púchov
Parndorf
Bratislava
Košice
UA border
Hegyeshalom
Budapest
Curtici
Arad
Simeria
Sighișoara
Brașov
Brazi
Craiova
București
Fetești
Constanța


SCANDINAVIAN - MEDITERRANEAN CORRIDOR
Passenger & Freight
ETCS in Operation
ETCS under Construction
Funded CEF
Key gaps by 2023 EDP
Key gaps beyond 2023 EDP
Planned by 2023 EDP
Planned beyond 2023 EDP
NO
SE
FI
DK
DE
AT
IT
Oslo
Stockholm
Stockholm Älvsjö
Järna
Åby
Hallsberg
Linköping
Mjölby
Göteborg
Ängelholm
Helsingborg
Kävlinge
Lund
Trelleborg
Malmö
RU Border
Kouvola
Juurikorpi
Helsinki
Kotka
Hamina
Turku/Naantali
København
Roskilde
Ringsted
Korsør
Odense
Snoghøj
Nykøbing
Flensburg Weiche
Lübeck
Rostock
Nassenheide
Berlin
Lauenbruck
Hamburg
Bremen
Uelzen
Visselhoevede
Nienburg
Bitterfeld
Halle
Leipzig
Hannover
Hildesheim
Erfurt
Kassel
Göttingen
Ebensfeld
Würzburg
Nürnberg
Treuchtlingen
Ingolstadt
München
Kufstein
Kufstein
Innsbruck
Brennero
Brennero (base tunnel)
Fortezza
Verona
Bologna
Prato
Ancona
La Spezia
Pisa
Firenze
Livorno
Terontola
Orte
Attigliano
Settebagni
Roma
Salone
Formia
Napoli
Bari
Villa San Giovanni
Taranto
Messina
Palermo
Catania
Augusta

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