National Implementation Plan **for ERTMS in Austria**

National implementation plan of Austria relating to the TSI for the “control-command and signalling” subsystems (ERTMS NIP)

pursuant to Article 6 of Commission Regulation (EU) 2016/919 of 27th May 2016

Austrian Federal Ministry
for Transport, Innovation and Technology
Radetzkystraße 2, 1030 Wien

Unit II / Infra 2 (Infrastructure Planning)
Unit IV / Sch 4 (Technological Principles, Railway Technology, Technological Research)

www.BMVIT.gv.at
infothek.BMVIT.gv.at

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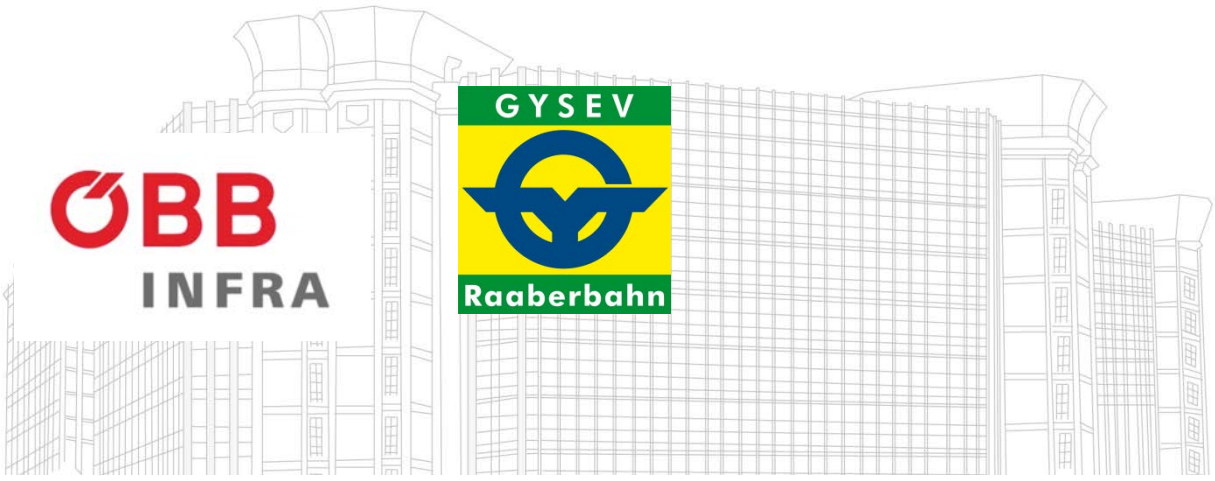
Based on contributions by



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1. Context, scope and contents

1.1 Legal requirements

This document presents the *National Implementation Plan* (NIP) to be notified by Member States to the European Commission pursuant to Article 6(4) and section 7.4.4 of the technical specification for interoperability relating to the 'control-command and signalling' subsystems[1].

The NIP complements and further details the ERTMS European Deployment Plan (EDP) adopted by the European Commission in January 2017 in an implementing act[2] on the legal basis of the TEN-T guidelines[3].

1.2 Scope and contents

Scope and contents of the NIP are specified in detail in point 7.4.4 of the TSI CCS. Table 1 summarises the scope of the NIP and compares it to the scope of the EDP.

Aspect	ERTMS NIP	ERTMS EDP
Geographical scope (network parts considered)	As defined in the technical specifications for interoperability (Commission Regulation (EU) 2016/919)	TEN-T core network corridors (Regulation 1316/2016, Annex I, Part I.2)
Time horizon	2017 to 2032 (15 years)	Phase 1: 2017 to 2023 Phase 2: 2024 to 2030

Table 1: Scope of ERTMS NIP and EDP

Regarding the contents, the TSI lay down detailed requirements; the present document is therefore structured accordingly as outlined in table 2.

[1] Commission Regulation (EU) 2016/919 of 27 May 2016 on the technical specification for interoperability relating to the 'control-command and signalling' subsystems of the rail system in the European Union

[2] Commission Implementing Regulation (EU) 2017/6 of 5 January 2017 on the European Rail Traffic Management System European deployment plan

[3] Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network and repealing Decision No 661/2010/EU

Requirement in TSI CSS	Section in this document
(1) General and context description	Chapter 1 and 2
(2) Definition of technical and financial migration strategy	Section 3.1 and 3.2
(3) Measures related to Class B train protection systems	Section 3.1.3
(4i) Dates of ETCS deployment on different lines	Section 4.1 and Annex I
(4ii) Indicative dates of decommissioning of Class B systems	Section 4.2
(4iii) dates when cross-border services fully benefit from 'ETCS only equipped on-onboard'	Section 4.3

Table 2: Coverage of the requirements specified in TSI CCS in this document

The NIP provides the following additional information as compared to the EDP:

- The NIP for ERTMS covers the whole rail network on which the TSI CCS applies whereas the EDP is limited to the TEN-T core network corridors.
- In terms of substance, the NIP also includes information on the technical and financial migration strategy and on the decommissioning of Class B systems.

In addition to the mandatory contents requirements from TSI CCS, section 3.1.4 gives an overview of current technical challenges for further ETCS deployment.

1.3 Elaboration of this document

This document has been elaborated in close cooperation between BMVIT and ÖBB-Infrastruktur AG. BMVIT mainly took over a coordinating and overseeing role. Development of the migration strategy and implementation planning were done by ÖBB Infrastruktur AG. Raaberbahn AG has been consulted on the state-of-play of ERTMS planning on their network (which partially belongs to the TEN-T comprehensive network). Further infrastructure managers and railway undertakings operating in Austria will be consulted at a later stage (see section 2.1).

2. General description

This chapter provides an overview of the ETCS planning, consultation and implementation processes in Austria, presents a general description of the existing Class B train protection systems in use in Austria and outlines the overall ETCS implementation strategy.

2.1 Overview of ETCS planning and implementation processes

The elaboration of the present national implementation plan is part of broader strategy, planning and implementation processes carried out by BMVIT, infrastructure managers and railway undertakings concerned.

The roles of BMVIT are mainly:

- to act as an interface between European Commission, the European Union Agency for Railways and infrastructure managers, with a view to ensure consistency between their strategies and plans and EU legislation and strategies (notably TSI CCS and the ERTMS EDP);
- to ensure the availability of funding for ERTMS deployment, through the allocation of appropriate financial resources in the six-year investment programme for rail infrastructure (see section 3.2);
- in the future, BMVIT will accompany consultation processes with railway undertakings and vehicle owners regarding ERTMS deployment.

Initial information is prepared in the internal ETCS Board of ÖBB-Infrastruktur AG, in an extended formation this board also includes BMVIT and NSA whenever needed. These forums shall provide a wide range of opportunities for BMVIT and NSA to participate.

In the current phase of migration planning, the migration process has not been coordinated with RUs. In the future, RUs will be consulted and involved in the migration process in a non-discriminatory manner. General and dedicated customer events shall ensure timely information and feedback for and from customers (ÖBB customer meetings, customer fair organised by ÖBB´s network access department especially for RUs).

ETCS planning and implementation at ÖBB-Infrastruktur AG follows a „three phase model“, including:

1. Basic strategy phase;
2. Elaborated strategy phase;
3. Implementation phase.

The information presented in this national implementation plan is fully in line with the internal planning and implementation process at ÖBB-Infrastruktur AG; however it has to be noted that it provides a momentary snapshot of the current state-of-play. Actual implementation will be continue to be re-evaluated taking into account future developments.

At the current stage, the signalling industry imposes key constraints on ERTMS implementation, as additional efforts are necessary to provide infrastructure managers and vehicle owners / operators with functionalities still under development. This lack of functionalities concerns both on-board and track-side equipment; section 3.1.4 provides a list of specific current challenges.

2.2 Existing train protection systems

The Austrian railway network is equipped with two Class B systems, PZB and LZB.

2.2.1 PZB

PZB is an automatic, punctual and intermittend system based on track magnets and unidirectional communication/influence of rolling stock units, based on signal aspects. The system features ability to emergency stop trains and influence their speed profile according to signal aspects.

2.2.2 LZB

LZB is a proprietary legacy system, continuously surveilling train run on an interactive, bidirectional basis. Data transfer is provided by medium frequency transmission (33-56kHz) by means of line transmitting cable along the track. Maintenance of trackside equipment is expensive. It will not be run in parallel with ETCS and removed in this case.

Overview for LZB:

- LZB control centre Wels: in the course of the upgrade of the current double track line to four tracks by 2022 between Linz and Wels, LZB will be replaced by ETCS in 2022.
- LZB control centre Pöchlarn: the economic lifetime will not be reached before 2028. Due to the priority ranking, its replacement by ETCS is not planned until 2030. Availability of spare parts is expected is to be ensured until 2030 (due to widespread use at DB Netz AG).

Table 3 summarises key features and characteristics of the Austrian class B systems and compares them with ETCS level 1 and 2.

Property / function	PZB	LZB	ETCS L1	ETCS L2
Data transmission	Trackside > vehicle (uni-directional); Intermittent	Trackside <> vehicle (bi-directional); Continuous	Trackside > vehicle (mainly uni-directional); Intermittent (continous with infill)	Trackside <> vehicle (bi-directional) Continuous
Signalling: **Lineside / cab;** **Lineside signals necessary**	Lineside; Yes	Cab; No (not implemented in practise)	Cab; In Austria: Yes	Cab; No
Restriction on max. speed	160 km/h (signal visibility)	No	In Austria: Yes	No
Compatibility with interlocking systems	Mechanical Electro-mechanical Relais Electronic	Relais Electronic	(Relais) Electronic	(Relais) Electronic
Availability of components (currently; trend)	High (c); decreasing (t)	High (c); decreasing (t)	Challenging (c); Increasing (t);	Challenging (c); increasing (t)
Economic lifetime of equipment	More than 40 years	25 years	25 years	25 years

Table 3: Existing train protection systems (Class B) compared to ETCS level 1 and 2

2.3 General strategy including cost-benefit considerations

This section outlines the key strategic considerations underlying the migration strategy and the implementation plan resulting from it.

The key premisses are:

- ERTMS is a key technical pillar to create an interoperable rail system in Europe. Given the high political priority Austria attaches to the shift of transport to environementally friendly transport modes including rail, Austria supports a strategy which aims to realise these benefits to the largest extent possible in the short, mid and long term.
- In the long term, a network-wide implementation of ERTMS will provide the full interoperability benefits of ERTMS while avoiding the cost of dual equipment with ERTMS and the legacy Class B systems. The migration phase, however, is more challenging.
- On the side of the railway undertakings, incomplete track-side deployment means that interoperability benefits cannot yet be fully realised while rolling stock deployment presents challenges in terms of cost, availbility and stability.

- On the infrastructure side, ERTMS needs to be integrated in a set of complex technical systems. These interrelations, in particular with interlocking systems, result in various constraints on the schedule for ERTMS deployment.
- ERTMS deployment on its own is not sufficient to create an interopable rail system. Further harmonisation of operational, technical and safety-related rules and procedures will be required; some of these issues are directly related to ERTMS.
- Legislation at EU level puts constraints on the planning at national level, in particular through the TSI CCS and the ERTMS EDP (see below).

European legislation defines a series of obligations to implement ERTMS:

- All new, upgraded or renewed ‘control-command and signalling’ systems (trackside and on-board) are within the scope of the TSI CCS, i.e. ETCS is mandatory in these cases. This requirement applies both to lines part of the TEN-T network and to other parts of the rail system. However, a derogation for a limited time can be granted if the CCS system is renewed on short and discontinuous sections of a line pursuant to Art 9(2) of Commission Regulation (EU) 2016/919.
- In addition to that, ERTMS deployment is also mandatory for existing lines and CCS systems on the TEN-T network. For the core and the comprehensive network, two general deadlines are defined: 2030 and 2050, respectively. On the TEN-T core network corridors, Member States are furthermore obliged to deploy ERTMS at the latest by the dates defined in the ERTMS European deployment plan (EDP).

These legal requirements provide the frame in which the national implementation plan can be further detailed based on technical or cost-benefit considerations. Table 4 gives an overview about the deadlines on different network parts.

Network part	Reference	Deployment deadline (for *existing* lines or CCS systems)	Deployment deadline (for *new, upgraded or renewed* lines or CCS systems)
TEN-T core network corridors	Commission Implementing Regulation (EU) 2017/6, Annex I (ERTMS EDP)	Individual sections as specified in the ERTMS EDP; at the latest 2030	On installation / upgrade / renewal of the CCS system (with possibility for derogation) Commission Regulation (EU) 2016/919 (TSI CCS)
TEN-T core network	Regulation 1315/2013, Art. 39 (TEN-T Guidelines)	2030	
TEN-T comprehensive network	Regulation 1315/2013, Art. 12 (TEN-T Guidelines)	2050	
Other parts of the rail system	Commission Regulation (EU) 2016/919 (TSI CCS), Article 2(3), point (c)	No specific deadline	

Table 4: Deadlines for ERTMS deployment on different network parts

3. Technical and financial migration strategy

This chapter outlines the technical and financial migration strategy of Austria.

3.1 Technical migration strategy

3.1.1 Technical context and constraints

As outlined in section 2.3, ERTMS is part of a set of complex technical systems which set the context for ERTMS deployment, including:

1. The type of interlocking is a key constraint for ETCS deployment: only electronic interlockings are compatible with ETCS (with some exceptions). No reinvestment in interlockings is planned in Austria in the context and due to ETCS migration. Moreover, synchronization with the BFS concept (centralization strategy of operation, command and control in Austria) has to be ensured in order to avoid lost investments.

2. ETCS migration should preferably take place contiuously over the years in order to ensure a steady distribution of financial and workload resources over time, avoiding excessive peaks in design and implementation.

3. Deployment of ETCS helps to increase safety targets.This may be necessary to compensate for an increase in network utlisation, i.e. growth in traffic and operating speeds.

4. At the current stage, capacity increases are not the main motivation for ETCS implementation.

5. ETCS Level 2, Baseline 2.3.0d was defined as the relevant baseline for the ÖBB railway network for the ongoing implementation. Compatibility to Baseline 3 has to be ensured.

6. Relevant subsystems of ETCS will be implemented in a geographically redundant way to ensure a high level of CCS system availability.

3.1.2 Overlay of ETCS and Class B systems

A permanent parallel equipment with both ETCS and existing class B systems is not intended. On existing lines equipped with PZB, parallel equipment with both ETCS and PZB is planned for a period of approximately three years.

The motivation for parallel equipment are not reliability constraints; parallel equipment is planned as a matter of continuity implementing ETCS on rolling stock and servicing PZB for RU in parallel for the time being.

Internal analyses of maintenance costs show that ETCS only equipment can result in significant cost savings as compared to parallel equipment. For lines with heavy traffic load, the potential savings amount to about 56%, while on secondary lines savings of about 44% could be realised.

Due to the fact that PZB is deployed on almost the entire Austrian network, operation and (limited) re-investment in PZB equipment on existing lines is planned to continue beyond 2030. After full migration of the Austrian trunk lines to ETCS, a complete discontinuation of PZB operation and deployment is expected for the second half of the 2030s.

In coordination with the RUs concerned, faster regional redeployment is however conceivable. In this case, precise arrangements can only be made based on a dedicated migration strategy, mainly driven by interoperability targets.

3.1.3 Measures taken to ensure open market conditions for legacy Class B train protection systems as set out in paragraph 7.2.3 of TSI CCS

Given the timeframe until the complete network for which the TSI CCS is applicable will be equipped with ETCS, the availability of Class B on-board equipment will continue to be essential to ensure non-discriminatory network access.

The key economic challenge is that these STMs are specific to each Class B system. The development costs are therefore spread over a lower number of units than in the case of ETCS OBUs, resulting in high costs per unit. This is somewhat mitigated by the fact that Austria is in the favourable situation to use the same PZB Class B system as Germany, which increases market size for STMs considerably.

STMs for PZB are offered by some, but not all suppliers of ETCS OBUs. Moreover, the STMs available are not always linked to the ETCS OBUs via a standard interfaces. Standardisation will therefore be necessary to ensure open market conditions.

As STMs are available at least from some suppliers and due to the significant potential market size for PZB STMs (due to the use of PZB in Germany), no specific measures regarding STM availability are foreseen at the current stage. However, the development of the market for STMs will be monitored if necessary. In doing so, information provided by railway undertakings or vehicle owners in the further consultation process will be taken into account.

3.1.4 Challenges to be addressed for efficient implementation

In recent years, maturity and stability of ERTMS has considerably increased. Nevertheless, challenges that hamper efficient implementation and operation of ERTMS continue to persist and in some cases new issues emerge.

Table 5 lists a number of key issues which – based on the assessment of ÖBB-Infrastruktur AG – should be addressed in the short, medium and long term to support efficiency of the system in implementation, operation and maintenance. The numbering is for reference purposes only and does not imply a priority ranking.

(1)	Technical solutions for standard functions still have to be solved by industry
(2)	Missing standard functionalities (reversing, startup-procedure, level 1 limited supervision on OBU) counteract against replacement of legacy systems, including removement of these systems
(3)	Supplying industry for both, infrastructure and rolling stock, is lacking in delivery and development obligations as well as in reliability. E.g. ongoing projects had to be postponed for 24 -36 months, functionalities ordered for 2013 still are not in service.(startup, reversing)
(4)	Homologation and uniformity concerning equipment of rolling stock is lacking because of implementation issues of suppliers. Temporary solutions and additional SRAC (safety related application conditions) are necessary and are corrupting interoperability expectations.
(5)	Intercommunication between RBC of neighbouring infrastructures still to be developed
(6)	„Handover“ between these systems in an acceptable time-frame (while train runs in border-section) is still problematic.
(7)	Transmission at national borders between ETCS-equipped lines and foreign legacy systems is not defined sufficiently. There are no feasible obligations for these (non-ETCS) countries to follow a stringent strategy despite introducing ETCS.
(8)	While technical definitions and solutions in ETCS are mainly uniformous, the operational conditions and strategies are quite different in the way, giving the supplying industry the chance to develop cost-intensive solutions for operational issues on a national, therefore not interoperable, basis. Every single infrastructure company has to pay development accordingly.
(9)	CMD (cold movement detection) as a safety relevant precondition for safe startup (of engine) without additional involvement of staff, is absolutely necessary. The necessety and obligation for implementation by rolling stock has been denied by ERA and causes serious trouble and inefficiency.
(10)	Regional lines: feasible system architecture on a „low cost“ basis for secondary, regional lines has not been defined or regulated up to now. Smaller RU therefore are in doubt of equipping Rolling Stock for these lines with ETCS – on a compatible basis from RU point of view.
(11)	„Traincompleteness detection“ is a preconditon for remarkable savings on infrastructure side. It is not defined or obligated to RU to the present, it is a preconditon for L3-solutions and for development on cargo-train compositions, where „end of train“ has to be set accordingly to every single train
(12)	International harmonization on marker boards: stopmarker, locationmarker, has to be derived and regulated, for any mode in ETCS (e.g, SH, UN, …)
(13)	Replacement strategy on GSM-R OBU, according to changed data transfer regulations from BL 3.4 onwards has to be driven by ERA, informing and putting obligations on the RU to act accordingly.
(14)	Shunting under ETCS cannot be used at the moment. Limitation of shunting by balises which shall not

be passed only works for the shunting locomotive alone. As soon as for example freight wagons are shunted, and the locomotive is at the rear end, no data concerning the length of freight wagons to be supervised are available. So for supervision of shunting movements with the locomotive at the rear end, shunting signals are necessary.

Table 5: Challenges for ERTMS implementation and operation

3.2 Financial migration strategy

3.2.1 Infrastructure side

The financing of ERTMS deployment on the infrastructure side will be ensured within the general framework for the planning and financing of rail infrastructure in Austria. This framework provides a stable and reliable financial framework for infrastructure managers over a six year period.

ERTMS deployment is carried out either in the framework of infrastructure construction or upgrade projects (e.g. in the case of major projects such as the Brenner Base Tunnel, the Semmering Base Tunnel, the Koralm line and others) or in the context of dedicated ERTMS projects. This distinction does not have implications on the conditions and procedures for financing. However, ERTMS deployment carried out as part of a wider infrastructure project is closely interrelated with the infrastructure components. Potential delays in the finalisation of the infrastructure component will inevitably affect the ERTMS deployment date.

In addition to funding provided at the national level, Austria will continue to apply for funding opportunities at European level, first and foremost under the Connecting Europe Facility and potential follow-up instruments in the next Multiannual Financial Framework,

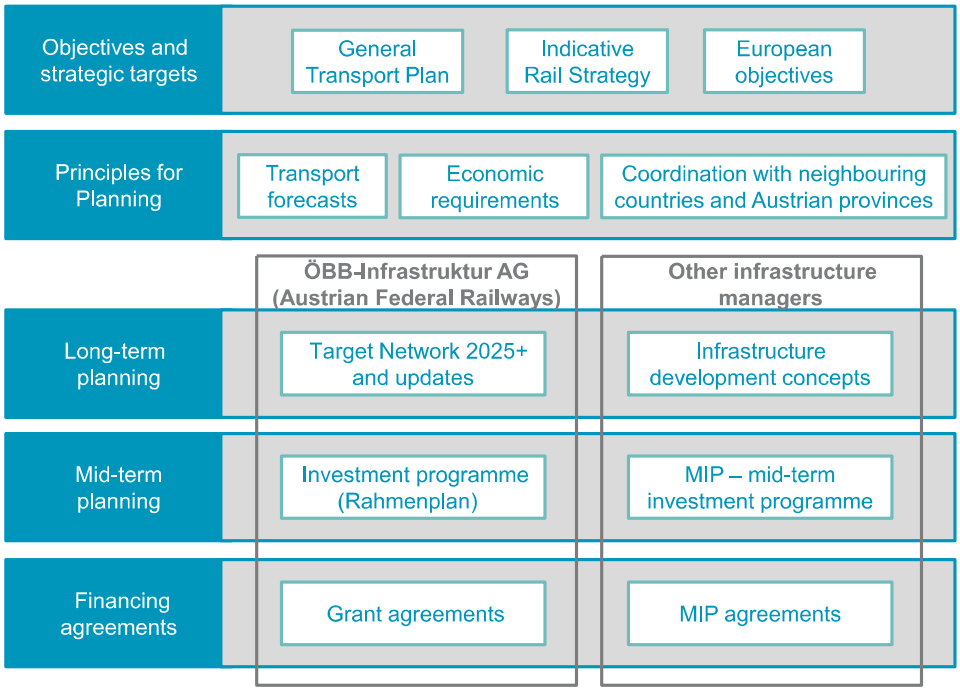

Figure 1: Railway infrastructure planning and financing in Austria

Background: The Austrian framework for rail infrastructure funding

This section briefly outlines the general framework for the planning and financing of rail infrastructure in Austria; figure 1 provides an overview.

The general strategic framework is defined by the General Transport Plan for Austria of 2012[4] and by objectives and strategies at EU level. Under this strategic framework – and based on a mid-term transport forecast (Verkehrsprognose 2025+) – a target network for the year 2025 was defined and presented to the public in 2011[5].

This target network is implemented in a step-wise fashion via investment programmes covering a six-year period ("ÖBB Rahmenplan"). The investment programmes cover the financial means for the construction of new infrastructure, the upgrade of existing infrastructure, for reinvestments in the existing infrastructure as well as for maintenance. In a continuous, rolling planning process, the investment programmes are regularly updated and their validity period is extended to maintain a six-year period; this is usually done on an annual basis. The investment programmes are approved by the Cabinet of Ministers.

The responsibility for the high-ranking Austrian rail infrastructure lies with a cooperation organised according to private law, ÖBB-Infrastruktur AG. This cooperation is a fully owned by the federal state of Austria via ÖBB-Holding AG. The core functions of ÖBB-Infrastruktur AG are the planning and the construction of rail infrastructure projects, the provision of reliable and appropriate rail infrastructure, as well as the safe and punctual operation of rail traffic.

The provision of funding for infrastructure investments, maintenance and operation by ÖBB-Infrastruktur AG is done on the basis of grant agreements between the federal state and ÖBB-Infrastruktur AG. These agreements specify funding conditions and payment arrangements and cover the same time period as the related investment programme.

ETCS deployment in the current investment programme

The investment programme currently in force ("Rahmenplan 2017–2022") covers the period 2017 to 2022.[6] The total funding secured for ERTMS deployment in the period 2017–2022 amounts to 158 million Euro.[7]

[4] Bundesministerium für Verkehr, Innovation und Technologie: Gesamtverkehrsplan für Österreich. Wien, 2012

[5] ÖBB-Infrastruktur AG: Zielnetz 2025+. Wien, September 2011

[6] See https://www.bmvit.gv.at/verkehr/gesamtverkehr/ausbauplan/downloads/praesentation_Rahmenplan_oebb_2017.pdf

[7] See page 12, line "ETCS und Zugbeeinflussung" of the document referred to in footnote 6.

This figure includes both ETCS deployment carried out in the framework of infrastructure construction projects and in the framework of dedicated ETCS projects on existing lines.

A mid-term update of the investment programme is currently in preparation. Funding for ETCS-related projects has been adjusted to the latest state-of-play regarding deployment. Table 6 reports the figures from the update instead of the yearly sums from the programme in force. The relatively limited funding in the years 2017 to 2019 reflects the fact that no deployment is foreseen in the years 2018 to 2020 (cf. section 4.1).

Year	Funding per year (million Euro)	Cumulative funding (million Euro)
2017	4	4
2018	4	8
2019	9	17
2020	29	46
2021	40	86
2022	78	164
2023	63	227

Table 6: Funding available per year under the mid-term update of the 2017-2022 investment programme

Outlook on the financial migration strategy beyond 2022/2023

Funding for ETCS deployment beyond 2022 is not secured at the current stage. However, ÖBB-Infrastruktur AG prepares and constantly updates internal estimates for the financial resources required to implement the deployment schedule indicated in section 4.1. These estimates indicate that investments in the period from 2024 to 2032 will be on the order of 30 to 50 million Euros per year.

Due to the six year period covered by the investment programmes, deployment schedule and the availability of funding can be adjusted to each other in due time. In this way, the financial migration strategy is continuously updated providing the basis for uninterrupted and efficient ETCS deployment.

3.2.2 Financial migration strategy on rolling-stock side

Under the European regulatory framework for the rail sector, non-discriminatory open access to rail infrastructure implies that owners and operators of rolling stock are private entities. On this basis, Austria as a member state does not consider it to be its task to define a comprehensive financial migration strategy for the rolling stock side.

Irrespective of that Austria is fully aware that migration of the rolling stock side is a key financial challenge for rolling stock owners and has wider implications for the economic situation of the rail industry as well as the competitiveness of the rail system in general. The migration phase is particularly critical, as significant

investments in OBUs must to be made while interoperability benefits cannot yet be realised to their full extent.

In order to ensure that ERTMS deployment supports the competitiveness of the rail system as whole, it is therefore essential that a comprehensive approach is developed, taking into account both the infrastructure and the rolling stock side. This will be ensured by establishing a continuous consultation process involving concerned railway undertakings and vehicle owners (see section 2.1).

The key financial resources to be used for ETCS equipment of rolling stock will be financial resources by the owners of rolling stock and – due to the strong European dimension of the issue – co-funding provided by the European Union.

4. Planning and schedules

Based on the considerations outlined in the preceding chapters, an implementation schedule has been developed.

4.1 Dates of ETCS deployment

In general, ETCS will be implemented on all new lines as well as on major retrofit lines of the high-level rail network. TEN-T core network corridors as well as “last mile” tracks (terminals) have the highest priority in the implementation process.

The maps in Annex I (figures 2 to 7) show the state of ETCS deployment on the network for a selection of years. Table 7 below summarizes the key steps as well as important reference dates.

Year	Key new sections compared to previous reporting year	Reference dates
2017	Deployment on Scan-Med CNC finalised in 2012 already (for freight, existing Brenner line); individual sections of Rhine-Danube, Baltic-Adriatic and Orient/East-Med CNC equipped	Current state
2021	Vienna Main Station (links Rhine-Danube, Baltic-Adriatic and Orient/East-Med CNC for passengers)	
2023	Additional sections on Rhine-Danube CNC Additional sections on Baltic-Adriatic CNC Deployment finalised on Orient/East-Med CNC All transit lines in the Vienna node	End of the first phase of the European Deployment Plan
2030	Deployment finalised on the entire TEN-T core network • Scan-Med CNC (incl. passenger, incl. Brenner Base Tunnel) • Rhine-Danube CNC • Baltic-Adriatic CNC • Orient/East-Med CNC (already in 2023) First sections on TEN-T comprehensive network	Deadline for TEN-T core network as per Regulation (EU) 1315/2013 End of the second phase of the European Deployment Plan
2032	Advanced deployment on comprehensive network First sections on non-TEN-T network (cluster of lines North of Vienna)	End of the period covered by the ERTMS NIP

Table 7: Summary of deployment stages in the period 2017 to 2032

The planning stability is higher for sections to be equipped until 2022 as this period is covered by the investment programme 2017–2022 (extended to 2023 by the mid-term update currently in preparation) and by the first phase of the European Deployment Plan (until 2023), for which specific deadlines for deployment (years) are defined at European level.All dates contained in this National Implementation Plan are fully in line with the European Deployment Plan.

Due to strategic planning issues and an ongoing tendering process no ETCS deployment will take place between 2018 and 2020.

All future deployment projects will implement ETCS level 2 equipment; this will include last mile connections, e.g. to marshalling yards such as Wien Zentralverschiebebahnhof. The existing level 1 sections Wels – Passau and Vöcklabruck – Salzburg (both on the Rhine-Danube CNC) will be converted to level 2 within the period covered by the NIP.

4.1.1 Migration planning at Raaberbahn AG

Raaberbahn AG (RoeE/GySEV) operates a regional cross-border rail network in the Eastern Austria and Western Hungary. As the Raaberbahn line from Wulkaprodersdorf to the state border between Austria and Hungary near Sopron is part of the TEN-T network in Austria (comprehensive network), BMVIT consulted Raaberbahn on its ETCS implementation strategy and plans.

Raaberbahn stated that the definition of an ETCS strategy is at an early stage. Currently, there are no imminent ETCS deployment projects; information on ETCS implementation will be shared with all relevant stakeholders in due course.

4.2 Indicative dates of decommissioning of Class B systems

In Austria, two Class B systems are currently in use (cf. section 2.2).

4.2.1 LZB system

LZB is the system in use for high-speed lines with a line speed of more than 160 km/h (cf. table 3). LZB is deployed on a relatively limited share of the network (approximately 240 line km); all LZB-equipped sections are located along the Rhine-Danube CNC between St. Pölten and Attnang-Puchheim. All LZB sections are also equipped with PZB to allow the circulation of vehicles equipped only with PZB on-board units.

The indicative decommissioning dates for the LZB system are presented in table 8.

Section	Date	Remark
Attnang-Puchheim – Linz	2022	Due to obsolescence of the LZB version used in the Wels control centre
Linz – St.Pölten (high speed line)	2030	End of service life of the equipment used in the Pöchlarn control centre

Table 8: Indicative decommissioning dates for the LZB Class B system

As a general principle, there will be no overlay on track-side during the migration from LZB and ETCS. For technical reasons, LZB system components have to be completely dismantled before ETCS can be deployed.

4.2.2 PZB system

The PZB Class B system is deployed on the entire rail network covered by TSI CCS in Austria.

On existing lines currently equipped with PZB, parallel equipment with both PZB and ETCS is planned for a period of approximately three years after ETCS deployment. At the earliest after that period, external lateral light signals and PZB track-side equipment (track magnets) will be dismantled.

The detailed schedule for the decommissioning of the PZB system will be defined at a later stage based, inter alia, on a consultation of railway undertakings concerned (see section 2.1).

4.3 Full benefits from “ETCS only equipped on-board”

On a general note, lines that are indicated to be equipped with ETCS in Annex 1 may be accessed by vehicles with ETCS on-board equipment only starting from the indicated date. On these lines, all main tracks authorised for train movements (i.e. excluding sidings authorised for shunting movements only) will be equipped with ETCS.

Passenger high-speed services will thus be able to run only with ETCS OBU as from the indicated deployment dates.

For freight services, it is planned that vehicles equipped only with ETCS OBU will be able to access rail-road terminals which are part of the TEN-T core network. The deployment date will be the same as the adjacent lines (see table 9). There are no detailed plans for deployment of ETCS on private sidings used for shunting and/or last mile services at the current stage.

Terminal	ETCS deployment date
Graz (Werndorf)	2023
Linz-Wels (Wels)	2023
Wien	2023

Table 9: Rail-road terminals of the TEN-T core network as defined by Annex II.2 of Regulation (EU) 1315/2013

Trains transiting Austria along the TEN-T core network corridors and which are only equipped with ETCS OBUs will fully benefit from the dates of complete deployment of the respective corridors in Austria (see table 7).

In addition to ETCS deployment along the TEN-T core network corridors, the deployment schedule includes a focus on the Vienna region (cf. figure 6 in Annex I). ETCS deployment on several regional lines in the North of Vienna is intended to create the track-side conditions necessary to permit a swift migration of the rolling stock used for commuter trains in the Vienna region (“Schnellbahn” system).

As at July 2017, ETCS on-board equipment is a mandatory network access condition on two lines: Wien – St. Pölten (Rhine-Danube CNC, high speed line only) and Baumkirchen – Radfeld (Scandinavian-Mediterranean CNC, high-speed line only). The third one, the newly built freight by-pass of St. Pölten – which will be equipped with ETCS only from the beginning –, will follow in December 2017 (Rhine-Danube CNC).

5. References

Strategy documents

Bundesministerium für Verkehr, Innovation und Technologie: Gesamtverkehrsplan für Österreich. Wien, 2012

ÖBB-Infrastruktur AG: Zielnetz 2025+. Wien, September 2011

ÖBB-Infrastruktur AG: Rahmenplan 2017–2022, Investitionen und Instandhaltung. Wien, Oktober 2016

ÖBB-Infrastruktur AG, GB Bahnsysteme: Fachstrategie ETCS (23 September 2016, v1.0)

Legal acts, regulations and guidelines

Directive 2008/57/EC of the European Parliament and of the Council of 17 June 2008 on the interoperability of the rail system within the Community (Recast)

Directive (EU) 2016/797 of the European Parliament and of the Council of 11 May 2016 on the interoperability of the rail system within the European Union (recast)

Commission Regulation (EU) 2016/919 of 27 May 2016 on the technical specification for interoperability relating to the ‘control-command and signalling’ subsystems of the rail system in the European Union

Commission Implementing Regulation (EU) 2017/6 of 5 January 2017 on the European Rail Traffic Management System European deployment plan

Bundesgesetz über Eisenbahnen, Schienenfahrzeuge auf Eisenbahnen und den Verkehr auf Eisenbahnen (Eisenbahngesetz 1957 - EisbG)

Bundesgesetz zur Neuordnung der Rechtsverhältnisse der Österreichischen Bundesbahnen (Bundesbahngesetz)

ÖBB-Infrastruktur AG: Dienstvorschrift V2 Signalvorschrift, Gesamtversion 2015-12-13

ÖBB-Infrastruktur AG: Dienstvorschrift V3 Betriebsvorschrift, Ausgabe 2017-06-11

ÖBB-Infrastruktur AG: Eisenbahnsicherungsanlagen: RW 13.01.01 Planungsrichtlinien Leit-/Sicherungstechnik, Ausgabe 2017-03-15

ÖBB-Infrastruktur AG: ETCS: RW 13.01.05 Planungsrichtlinien Leit-/Sicherungstechnik, Ausgabe 2017-04-01

List of abbreviations

BFS	Operations Centralisation Strategy (*Betriebsführungsstrategie*)
BMVIT	Austrian Federal Ministry for Transport, Innovation and Technology (*Bundesministerium für Verkehr, Innovation und Technologie*)
CCS	Control, Command and Signalling
CNC	Core Network Corridor of the TEN-T network
EDP	ERTMS European Deployment Plan
ERA	European Union Agency for Railways
ERTMS	European Rail Traffic Management System
ETCS	European Train Control System
LZB	Austrian Class B CCS system (*Linienzugbeeinflussung*)
NIP	National Implementation Plan
NSA	National Safety Authority
OBU	On-Board Unit
PZB	Austrian Class B CCS system (*punktförmige Zugbeeinflussung*)
RU	Railway Undertaking
STM	Specific Transmission Module
TEN-T	Trans-European Network for Transport
TSI	Technical Specification for Interoperability

Annex 1 – ETCS deployment dates

Figures 2 to 7 show ETCS deployment on the Austrian rail network covered by TSI CCS for selected years, including notably 2030 (deadline for equipment of the TEN-T core network) and 2032 (end of the period covered by this NIP).

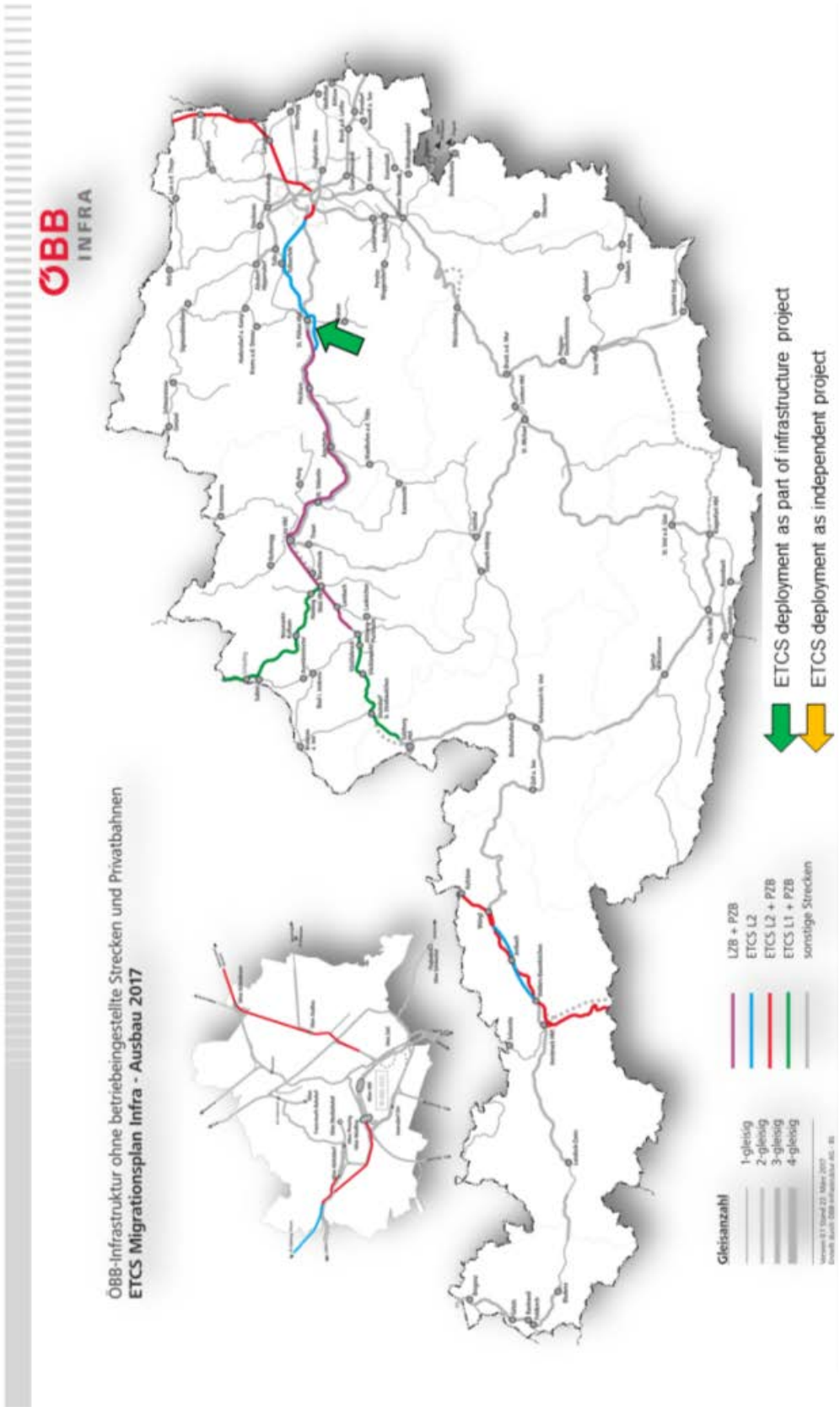

Figure 2: ETCS deployment 2017

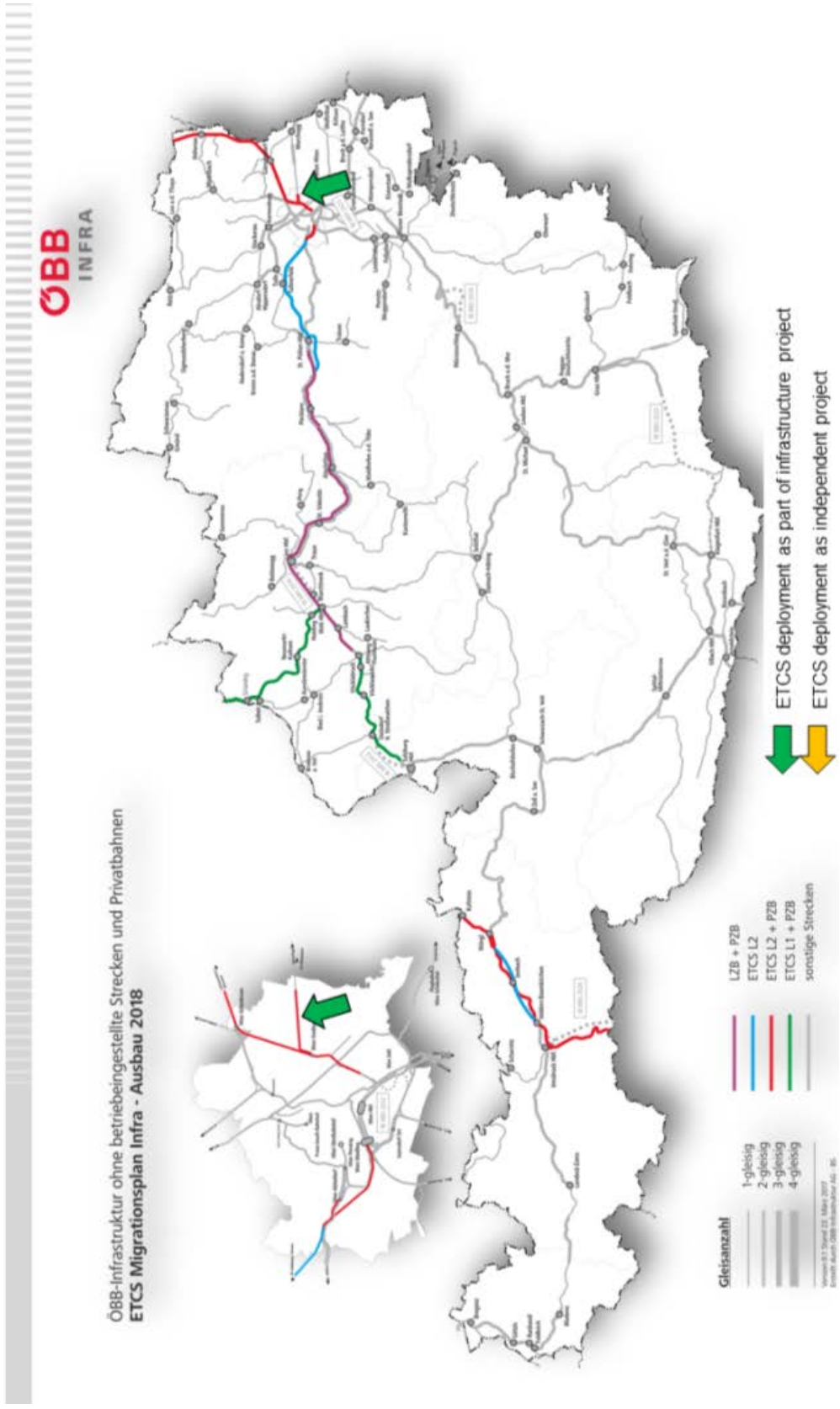

Figure 3: ETCS deployment 2018

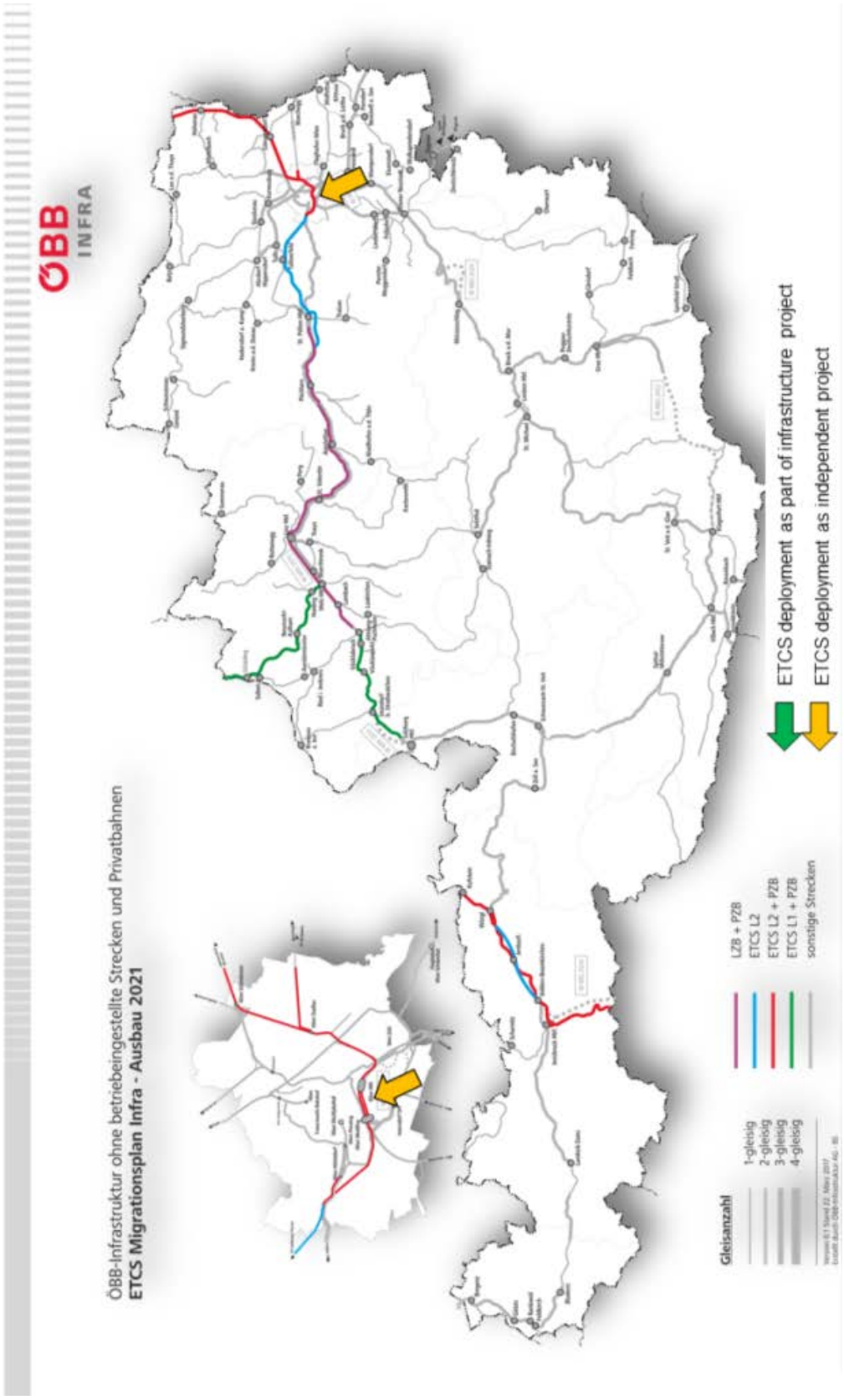

Figure 4: ETCS deployment 2021

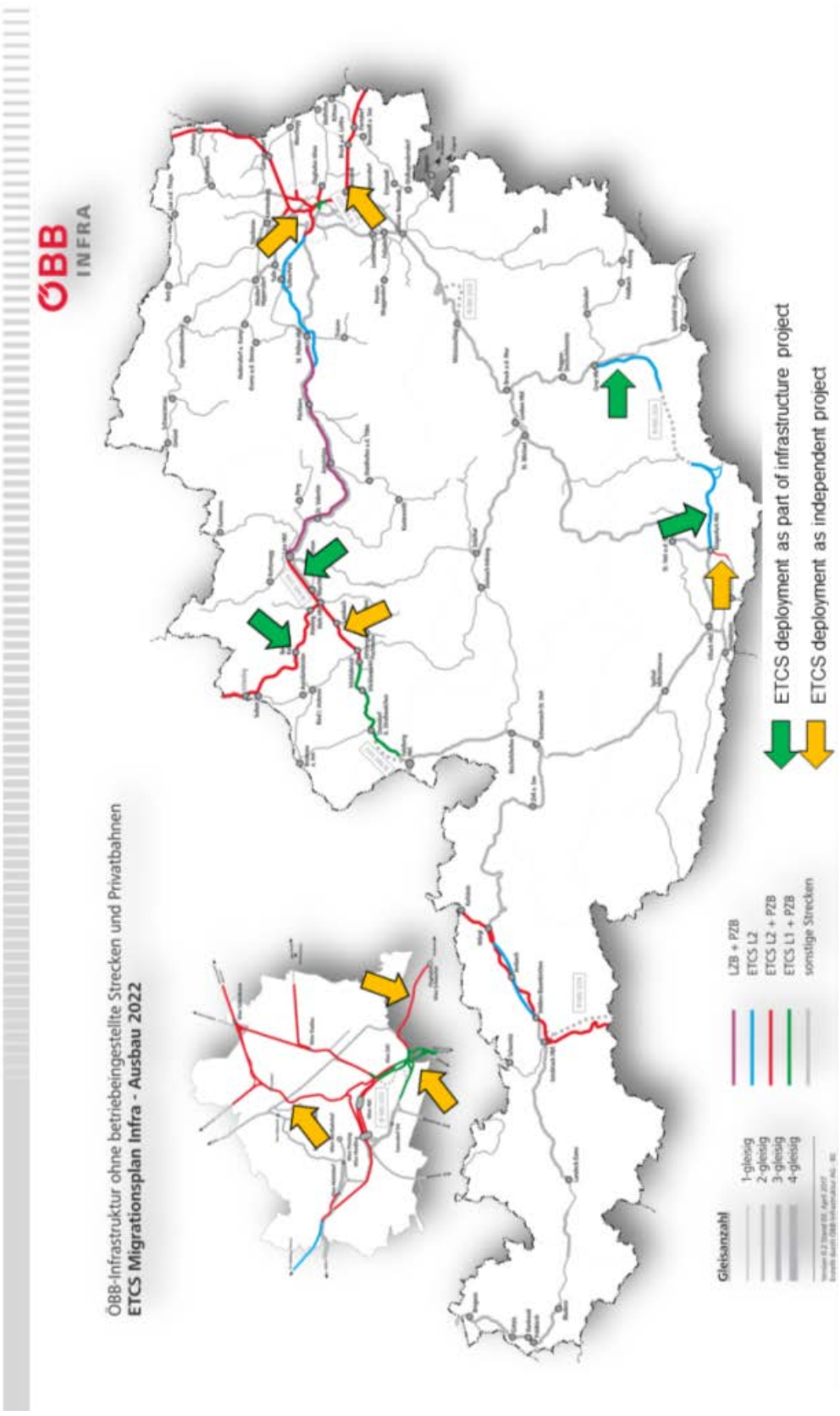

Figure 5: ETCS deployment 2022

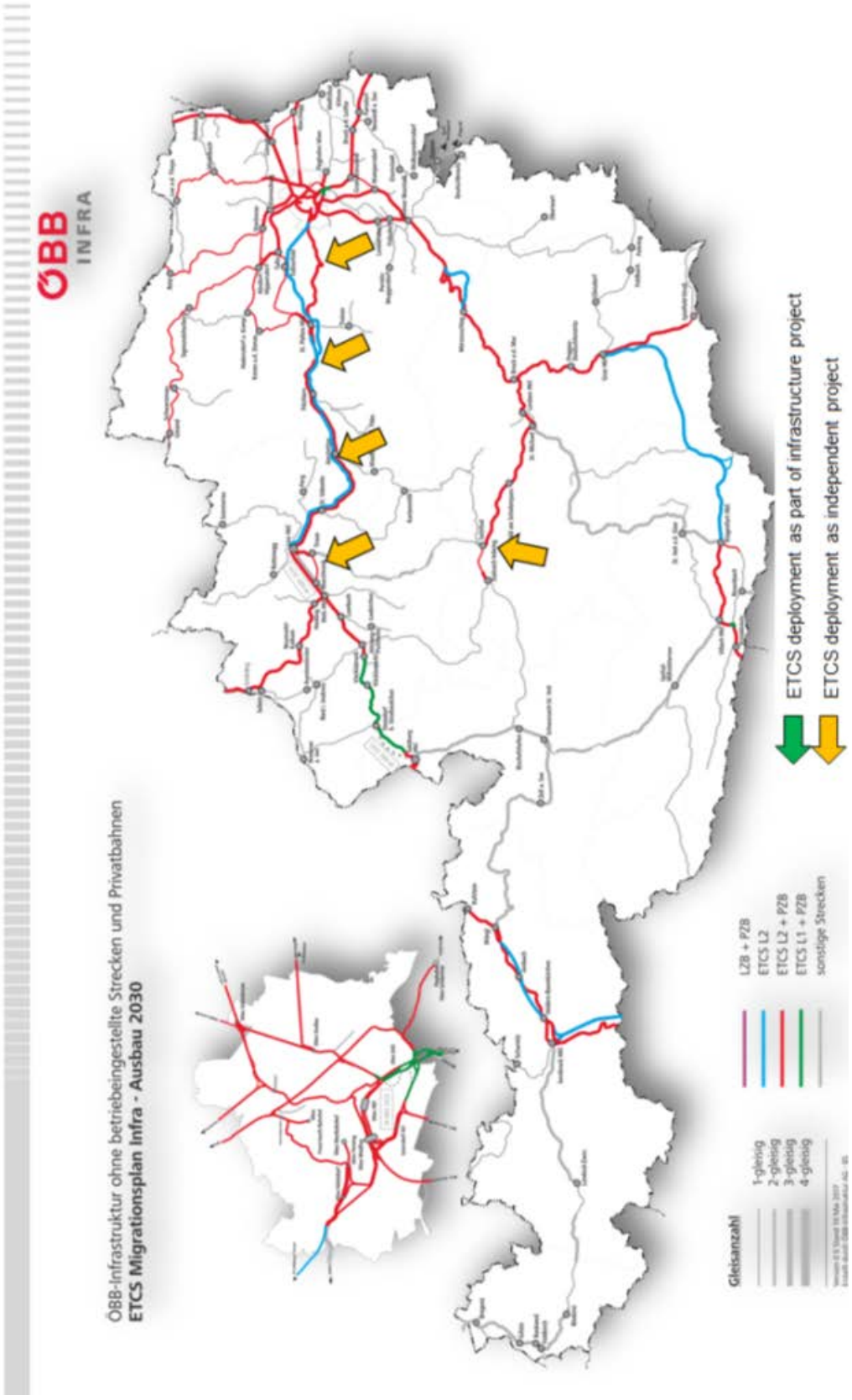

Figure 6: ETCS deployment 2030

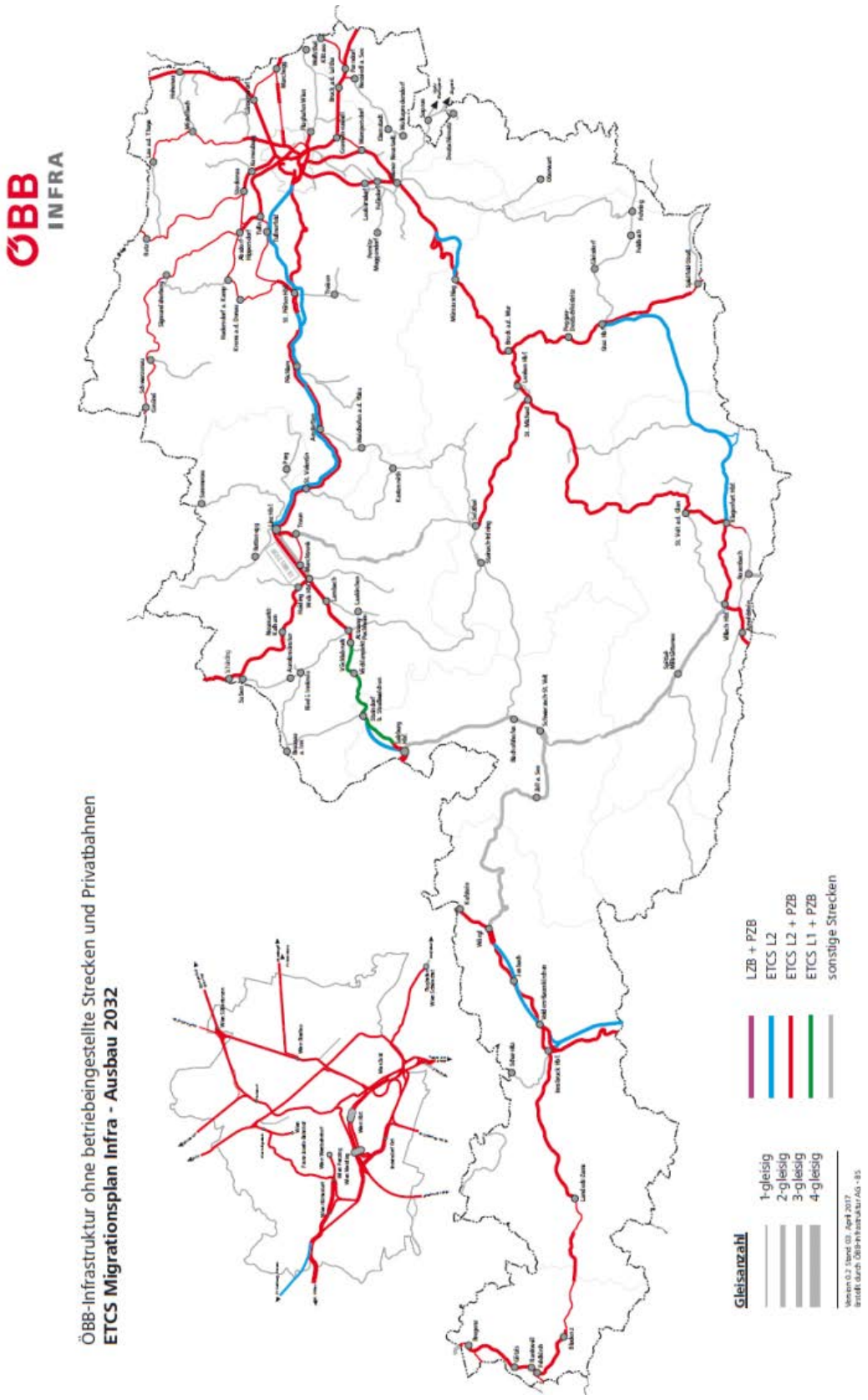

Figure 7: ETCS deployment 2032

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Radetzkystraße 2, 1030 Wien
www.BMVIT.gv.at
infothek.BMVIT.gv.at

Key contributor

ÖBB-Infrastruktur AG
Praterstern 3, 1020 Wien
www.oebb.at/infrastruktur