

High Performance Network in Austria

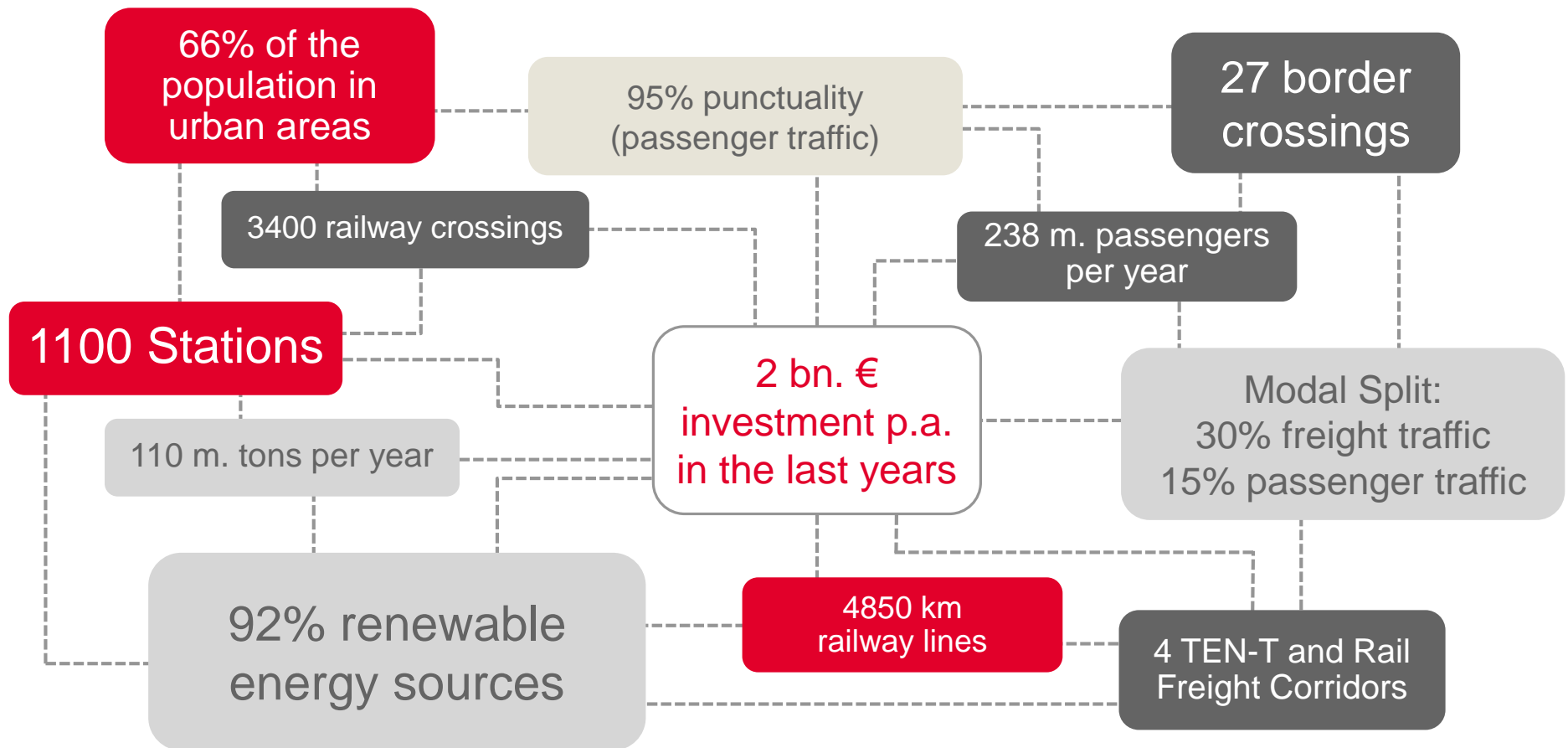
Conference |

High Speed Lines in the Czech Republic – Construction projects and Operational Concepts



Facts

Austria and the railways



... the development of the Austrian railway network...



- » Past
- » Present
- » Future



- » Strategies
- » Concepts
- » Projects



- » Specialties
- » Characteristics
- » Technics

Railways in Austria

1945-1986

The overall **situation**

- » Railway network based on the **network** of the **monarchy**
- » **Reconstruction** of rail infrastructure after World War II
- » Only metropolis Vienna was an the **edge of Austria** with **dead-end stations** from all directions
- » Financial constraints

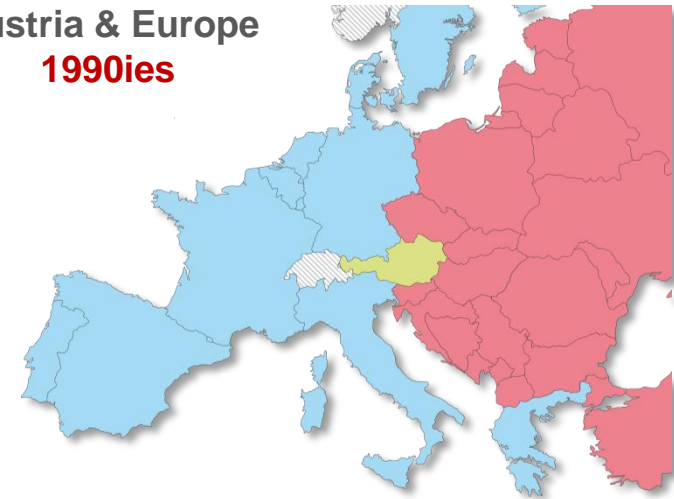
Trends and **image**

- » Railways were **out-of-time**
- » Trends towards **motorization**
- » **Environmental** aspects ignored
- » **No competitiveness** with individual transport (car)

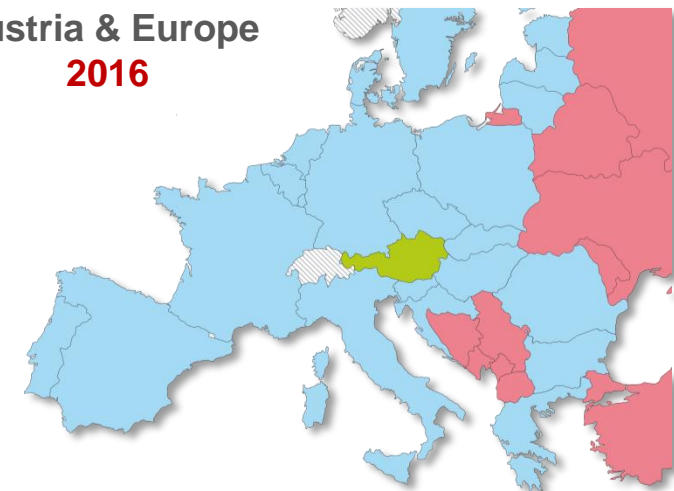
Infrastructure **projects**

- » **Deconstruction** of lines due to the iron curtain
- » Main focus on **electrification** projects
- » Increase of speed on the main lines up to **140 km/h**
- » Improvement of **capacity** mainly for freight transport
- » Construction of **shunting yards** Kledering (Vienna) and Villach

Austria & Europe
1990ies



Austria & Europe
2016



“The New Railway” – “Die Neue Bahn”

... the start of the relaunch ...

1986: **Study** by Arthur D. Little

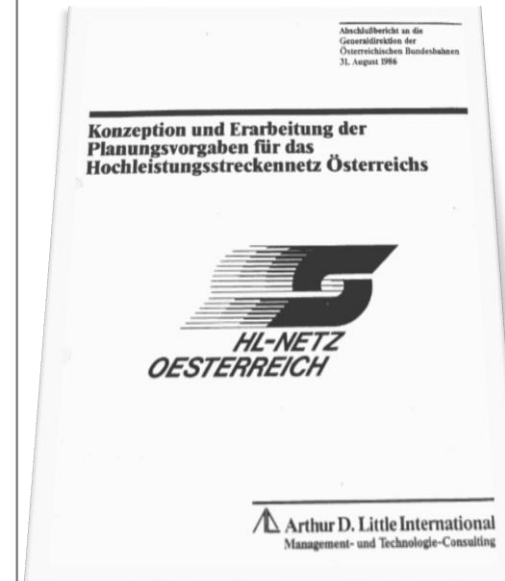
“HL-Netz Österreich”:

» Analysis:

- The Austrian Railways (ÖBB) are **technically and economically obsolete**
- The extension and upgrading of the Railways in Austria is **determined by the topology**

» Recommendations:

- Focus on **high performance lines** (HL-Strecken) with **mixed traffic** (V_{\max} 200km/h)
- **Cutting of travel times** especially on the Danube and Pontebbana (Baltic-Adriatic Corridor)
- **Improvement of capacity** for freight traffic
- Construction of a **central station** in **Vienna**
- Enhancement of **attractiveness** of existing **stations**
- Implementation of an **integrated timetable concept**
- **Establishment** of a own **company** for the construction of high performance lines



... what happened **next** ...

- » **1987: Approval** of the modernization concept “Neue Bahn” by the government
- » Permanent process: **Amendments of the upgrade/extension strategy** due to market situation (especially after the fall of the iron curtain)

Regime of High Performance Lines

Strategic Environmental Assessment

HL-AG – Company for High Performance Lines

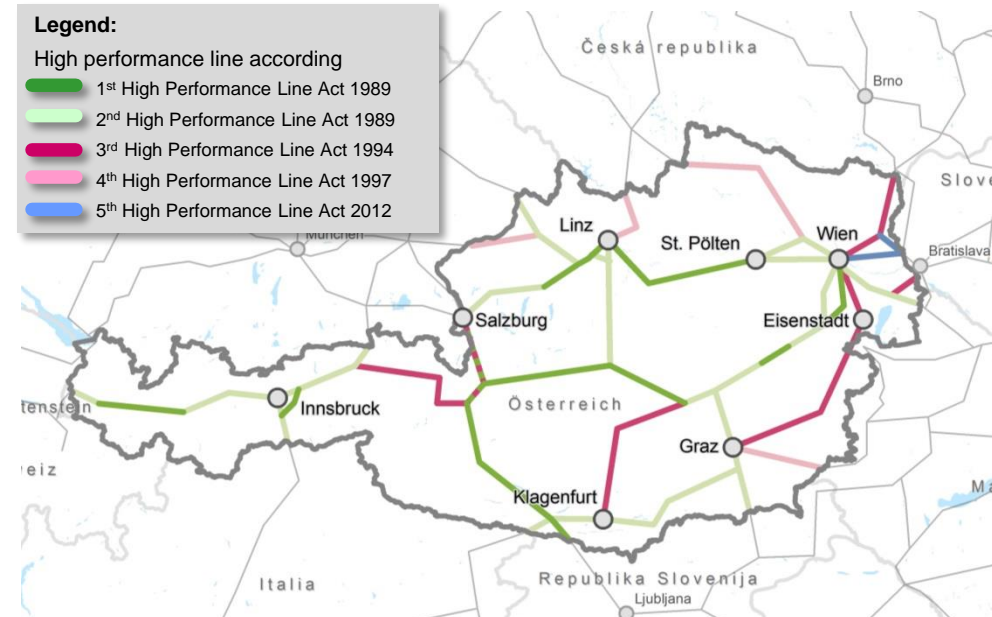
- » 1989: Establishment of *Hochleistungsstrecken AG*
- » **Development, construction and financing** of rail infrastructure projects
- » Own **project management**; cooperation with ÖBB-Experts
- » 2005: **Merger** with ÖBB-Infrastruktur Bau AG

HL-Gesetz – High performance lines act

- » “The Federal Government can declare existing and planned railways (...) to **high-performance lines** by regulation (...). The prerequisite is, that this is of particular importance for the efficient traffic with international connections or for local transport.”
- » Advantages for **authority approval procedures** and land acquisition

Strategic Environmental Assessment (2001/42/EC)

- » **SP-V-Gesetz** (Strategische Prüfung Verkehr) – Strategic Assessment - Transport:
*The Federal Minister (...) has to carry out a **strategic assessment** before preparing the following drafts (...):*
*The declaration of planned or existing railways to **high-performance lines** (...)*
- » 1 **SEA** for railways was successfully carried out and implemented in the HL-Act:
 - Lines: Stadlau – Marchegg and Gänserndorf – Marchegg (2012)
- » Another **SEA** for railways is ongoing:
 - Line: Vienna - Flughafen Vienna - Győr - Budapest



Source: RaumUmwelt Planungs-GmbH



... the operation of mixed traffic ...

the concept of **mixed traffic**

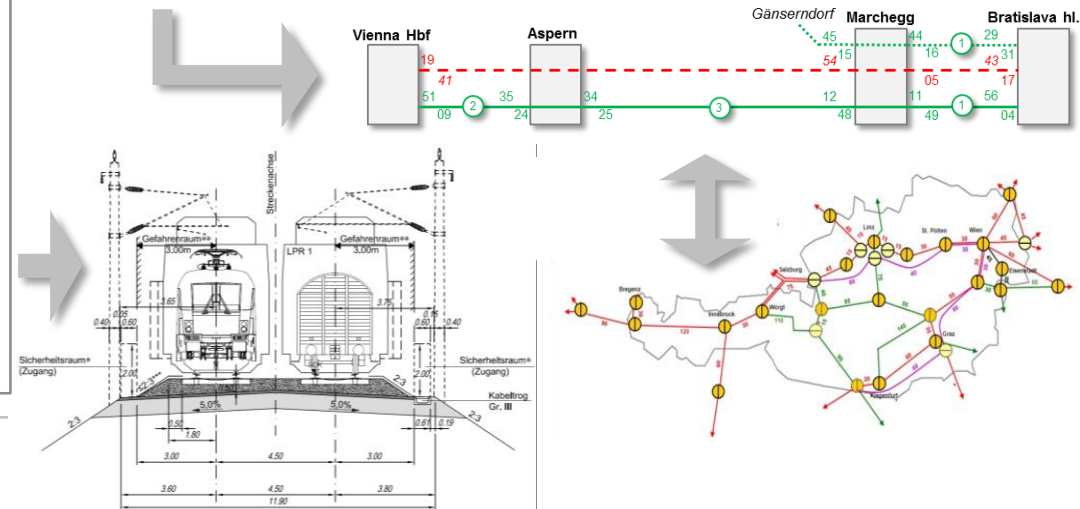
- » Definition of common valid **design parameters**
- » Common understanding of the **operational concept** (idea of a timetable) at a very beginning of a design project and permanent adjustment due to changing market condition

design **parameters**

- » Balance of the **dynamic behavior of vehicles**, **maintenance costs** and **construction costs** based on the forecasted operational concept
- » Maximum **speed**: 230 km/h (250 km/h where feasible)
- » Maximum **inclination** track: 8 ‰ (exception 12,5 ‰)
- » Maximum **cant**: $D = 160$ mm
- » Maximum **cant deficiency**: $I = 100$ mm (exception 130mm)
- » **Slab track** in tunnels length > 500 m
- » **Turnouts** with $V_{\max} > 160$ km/h: movable point at turnout crossing
- » Distance between **track centers**: 4,50 m (4,0 m at $V_{\max} \leq 160$ km/h)
- » Development of new **standard cross section** (special aspects: **aerodynamics** and **protection of workers**)

definition of future **operational concept**

- » The decision for mixed traffic has a **high influence** on the **capacity consumption** of a track
 - Different **maximum speed**; different stops
 - **Determines** crossing sections/passing loops, single or double track sections
- » Development of an **network utilization plan** (future timetable) as a **long-lasting design basis** for the dimensioning of the railway infrastructure
- » Based on the
 - node-link model (**integrated timetable**)
 - maximum speeds
 - target travel times



From requirements to a long term infrastructure strategy

Zielnetz 2025+ | Target Network 2025+

(Decision from 2011)

Basis / Inputs

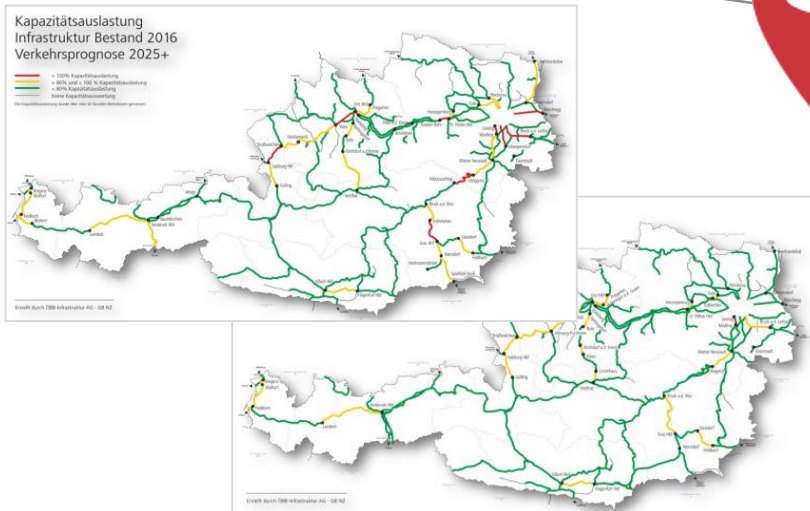
- » “Die Neue Bahn” – “The New Railway”
- » Ongoing European harmonization / National regulations
- » Changing market conditions
- » Different economic possibilities / conditions
- » Capacity bottlenecks (present / forecasted)

Focus / Programs

- » Increase modal split
- » Network development
- » Accessibility stations
- » Highly synchronized timetable
- » Strategy signaling / control centers / ETCS



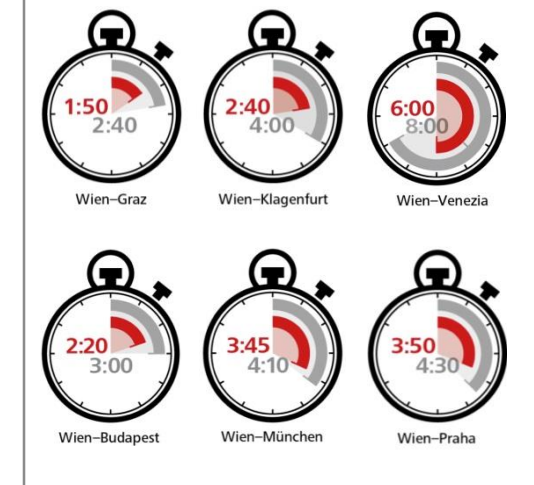
Zielnetz 2025+



2017 – 2022:

→ EUR 15,2 bn. investment

Faster connectivity



Zielnetz 2025+ | Target Network 2025+

... our main projects ...



New Westbahn

- » New line / 4-track upgrade
- » Speed up to 250 km/h
- » Status: under construction
- » Start of Service: Sections in operation

Vienna main station

- » European transport hub
- » 1.000 trains daily
- » Status: completed
- » Start of Service: 2015



Semmering base tunnel

- » Speed up to 230 km/h
- » 27 km long
- » Status: under construction
- » Start of Service: 2026

Brenner base tunnel

- » Joint project with Italy
- » 64 km long railway tunnel
- » Status: under construction
- » Start of Service: 2026



Koralmbahn railway

- » 130 km new railway lines
- » 33 km long Koralmbahn tunnel
- » 12 new Stations
- » Status: under construction
- » Start of Service: 2023



Focus:

... our connection from Vienna to Prague ...

Vienna **Süßenbrunn – Bernhardsthal**

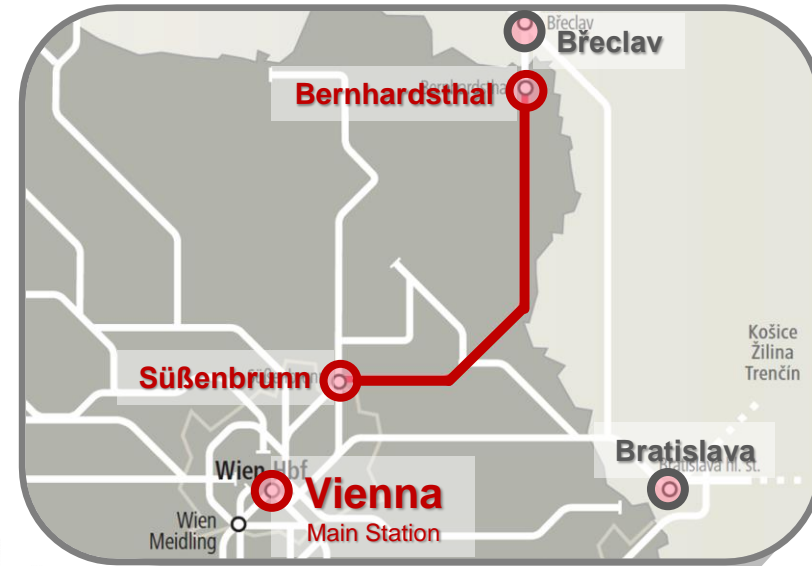
- » **Modernization and Upgrade Project:**
Line Vienna Süßenbrunn – Bernhardsthal
- » Based on **Agreement between Ministries** of AT and CZ (2015)

Project **Goals**

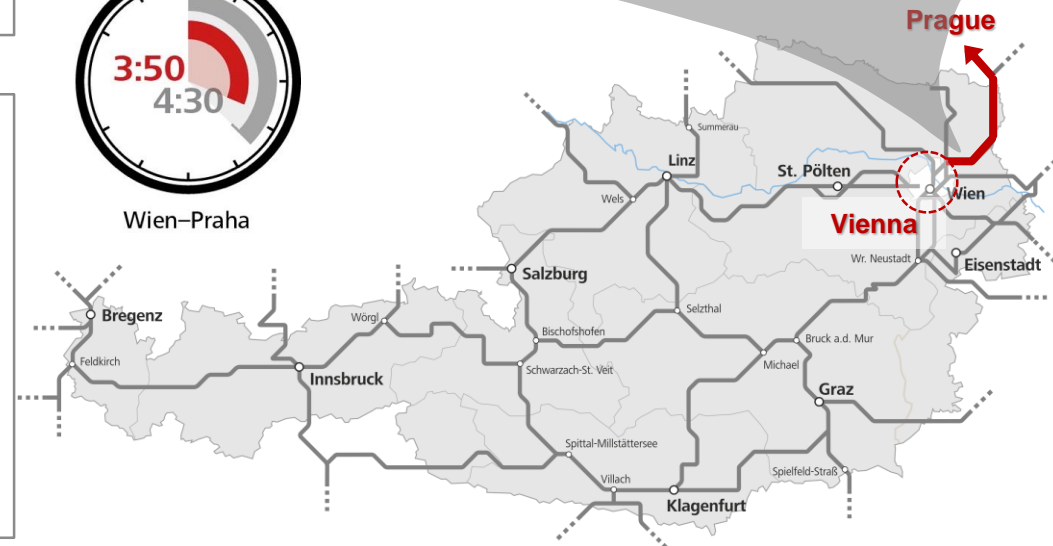
- » Increase of **Capacity**
- » **Reduction of travel time** Vienna – Prague down to **3h 45min**
(Section time Vienna Main Station – Břeclav: **60min**)

Key Facts (part AT)

- » **Track length** Vienna Süßenbrunn – Bernhardsthal: **65 km**
- » Renewal of **sub- and superstructure**
- » **Increase of speed** from 120 km/h to **160 km/h**
- » **Station modernization** and PRM-accessibility
- » Closure of **level crossings**
- » **Automatization** of train operation
- » Total Costs: ~ **€ 600 million** (financing secured)
- » Project status: start of **EIA** and **project design phase**



Wien–Praha



Focus:

... how we cross our borders ...

the **future** of the railway

- » An **integrated European railway network** is the prerequisite for the competitiveness of the overall railway system.
- » For an efficient European railway network the implementation of **coordinated cross border projects** is necessary.

the **past** decades

- » **Limited** cross border traffic (mainly due to political situation)
- » Railway system **not competitive** in long distance traffic
- » Optimization of **national networks**

possible **measures**

- » Elimination of **bottlenecks** (e.g. significant speed limitations, axle load, clearance gauge)
- » Increase of **capacity** (e.g. 2-track upgrade)
- » Line **electrification**
- » Complete **new** cross border lines (e.g. with tunnels, bridges, high-speed lines)

current **challenges**

- » Different **local interests**
- » No reliable/confident confirmation of **future train services**
- » Benefits of the project will be consumed by **one partner** by majority
- » Changes of **political backing** in one country
- » Different national **authority approval** processes
- » Different **financing concepts**. No guaranteed **EU-funds** (esp. in early project phases)



Focus:

... cross border initiatives ...

Rail Freight Corridors (RFC)

- Baltic-Adriatic
- Orient/East-Med
- Scandinavian / Mediterranean
- Rhine-Danube

Northern branch Brenner (RFC 3)

- › Joint feasibility study incl. corridor and route selection (AT and DE)
- › Based on an agreement between ÖBB and DB

Electrification Vienna – Bratislava (RFC 5+7)

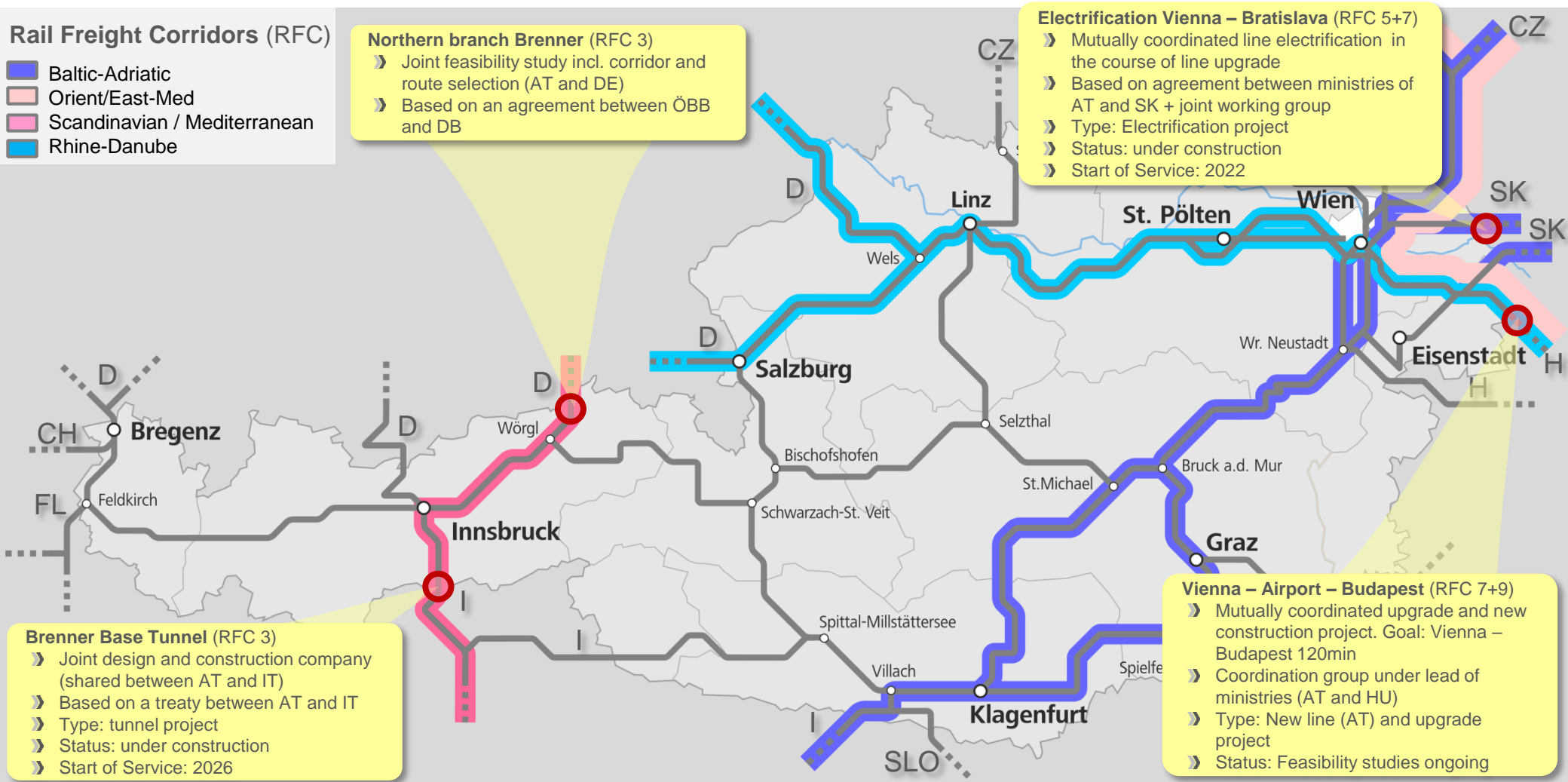
- › Mutually coordinated line electrification in the course of line upgrade
- › Based on agreement between ministries of AT and SK + joint working group
- › Type: Electrification project
- › Status: under construction
- › Start of Service: 2022

Brenner Base Tunnel (RFC 3)

- › Joint design and construction company (shared between AT and IT)
- › Based on a treaty between AT and IT
- › Type: tunnel project
- › Status: under construction
- › Start of Service: 2026

Vienna – Airport – Budapest (RFC 7+9)

- › Mutually coordinated upgrade and new construction project. Goal: Vienna – Budapest 120min
- › Coordination group under lead of ministries (AT and HU)
- › Type: New line (AT) and upgrade project
- › Status: Feasibility studies ongoing



... let us sum up ...

in a **nutshell**

Vision:

- » We want to get as many people as possible **excited about railway** travel!



Challenges:

- » Competition between **modes of transport** (new types e.g. car sharing, e-mobility, automatization):
- » Increasing **safety requirements**
- » Shortage of **resources** (financial, environmental)
- » Complexity and duration of **authority approval** processes
- » Imbedding national networks into an **comprehensive European network**
 - Improve **cross border project** processes
- » European **harmonization process**
 - **Pro-active participation** (e.g. CER, ERA, UIC, national Authorities)



Is there a future for the railway? → YES

- » We have to do our **homework**
 - become more efficient and customer oriented
- » Keep and further develop our **visions!** Think **beyond borders**
 - national and railway-system related



... thank you for your attention...



viktor.plank@oebb.at
+43 664 884 25 415

ÖBB-Infrastruktur AG
Asset Management & Strategic Planning
Masterplaner

