Facts
Austria and the railways

- 66% of the population in urban areas
- 3400 railway crossings
- 1100 Stations
- 110 m. tons per year
- 238 m. passengers per year
- 27 border crossings
- 4850 km railway lines
- 92% renewable energy sources
- 2 bn. € investment p.a. in the last years
- 4 TEN-T and Rail Freight Corridors
- 95% punctuality (passenger traffic)
- Modal Split: 30% freight traffic 15% passenger traffic
- 27 border crossings
- 95% punctuality (passenger traffic)
- 238 m. passengers per year
- 4850 km railway lines
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- 2 bn. € investment p.a. in the last years
- 4 TEN-T and Rail Freight Corridors
… 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 competiveness 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
“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** ($V_{\text{max}}$ 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 *Hochleitstungsstrecken 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:
- Another *SEA* for railways is ongoing:
  - Line: Vienna - Flughafen Vienna - Győr - Budapest

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*Legend:*
- High performance line according
  - 1st High Performance Line Act 1989
  - 2nd High Performance Line Act 1989
  - 3rd High Performance Line Act 1994
  - 4th High Performance Line Act 1997
  - 5th High Performance Line Act 2012

*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**
... for mixed traffic at **high performance lines** in Austria:
- 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 \( V_{\text{max}} > 160 \text{ km/h} \): movable point at turnout crossing
- Distance between **track centers**: 4.50 m (4.0 m at \( V_{\text{max}} \leq 160 \text{km/h} \))

**standard cross section**
- Balance of investment cost and technical requirements
  - Standard operation and maintenance
- Analysis of 51 different cross section types
- Special aspects:
  - Aerodynamics
  - Protection of workers
... the operation of mixed traffic ...

definition of future operational concept

... as basis for infrastructure design:

» 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

**Modal shift to rail:**

- 300 Mio. passengers
- 180 Mio. tonnes of freight
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

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

**Semmering base tunnel**
- Speed up to 230 km/h
- 27 km long
- Status: under construction
- Start of Service: 2026

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

**Faster connectivity**
- Wien-Graz: 1:50
- Wien-Klagenfurt: 2:40
- Wien-Venedig: 6:00
- Wien-Budapest: 2:20
- Wien-München: 3:45
- Wien-Praha: 3:50

Wien main station
- Start of Service: 2015
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

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

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

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

Northern branch Brenner
- Joint feasibility study incl. corridor and route selection (AT and DE)
- Based on an agreement between ÖBB and DB
Focus:
Regulations and European Harmonization

European Harmonization Process

Scope of action regarding technical, economic and legal aspects

Pro-active participation in harmonization / regulation process (e.g. CER, ERA, UIC, national Authorities)

Consideration of national interest and characteristics at a very early stage
... let us sum up ...

<table>
<thead>
<tr>
<th>Vision:</th>
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<tbody>
<tr>
<td>» We want to get as many people as possible <strong>excited about railway</strong> travel!</td>
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<table>
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<tr>
<th>Challenges:</th>
<th></th>
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<tbody>
<tr>
<td>» Competition between <strong>modes of transport</strong> (new types e.g. car sharing, e-mobility, automatization):</td>
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<td>» Increasing <strong>safety requirements</strong></td>
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<td>» Shortage of <strong>resources</strong> (financial, environmental)</td>
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<td>» Complexity and duration of <strong>authority approval</strong> processes</td>
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</table>
| » Imbedding national networks into an **comprehensive European network**  
  → Improve **cross border project** processes |  |

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<tr>
<th>Is there a future for the railway?</th>
<th>→ YES</th>
<th></th>
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</thead>
</table>
| » 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…