

European Electrification Experience

Rüdiger Stolle – Head of Engineering – Germany

PWI Electrification Seminar

11th July 2024, London





Agenda

- 01 Introduction
- 02 Funding of Railway Infrastructure
- 03 Examples of new project realization:
“Corridor Projects” and “Alliance Model”
- 04 Recruiting and Training of personnel for OLE-Railway Business
- 05 Relationship OLE Industry, Government, Deutsche Bahn



1

Introduction

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Quick Introduction

Dipl.-Ing. (FH) Rüdiger Stolle

since 03/1993: in rail electrification business, first as project manager of light rail projects and 3rd rail in Berlin

2001 – 2003: residence in USA, project manager und designer of electrification project in Houston/Texas (OCS und Power Supply)

since 12/2023: Head of Engineering SPL Germany (about 30 Engineers)
since 2011 head of Engineering Powerlines Group

Member in national standard-committee EN 50119 and EN 50367 (DKE) and in many other workgroups (like BIM-implementation) within Deutsche Bahn AG, diverse contributions in forums and conferences

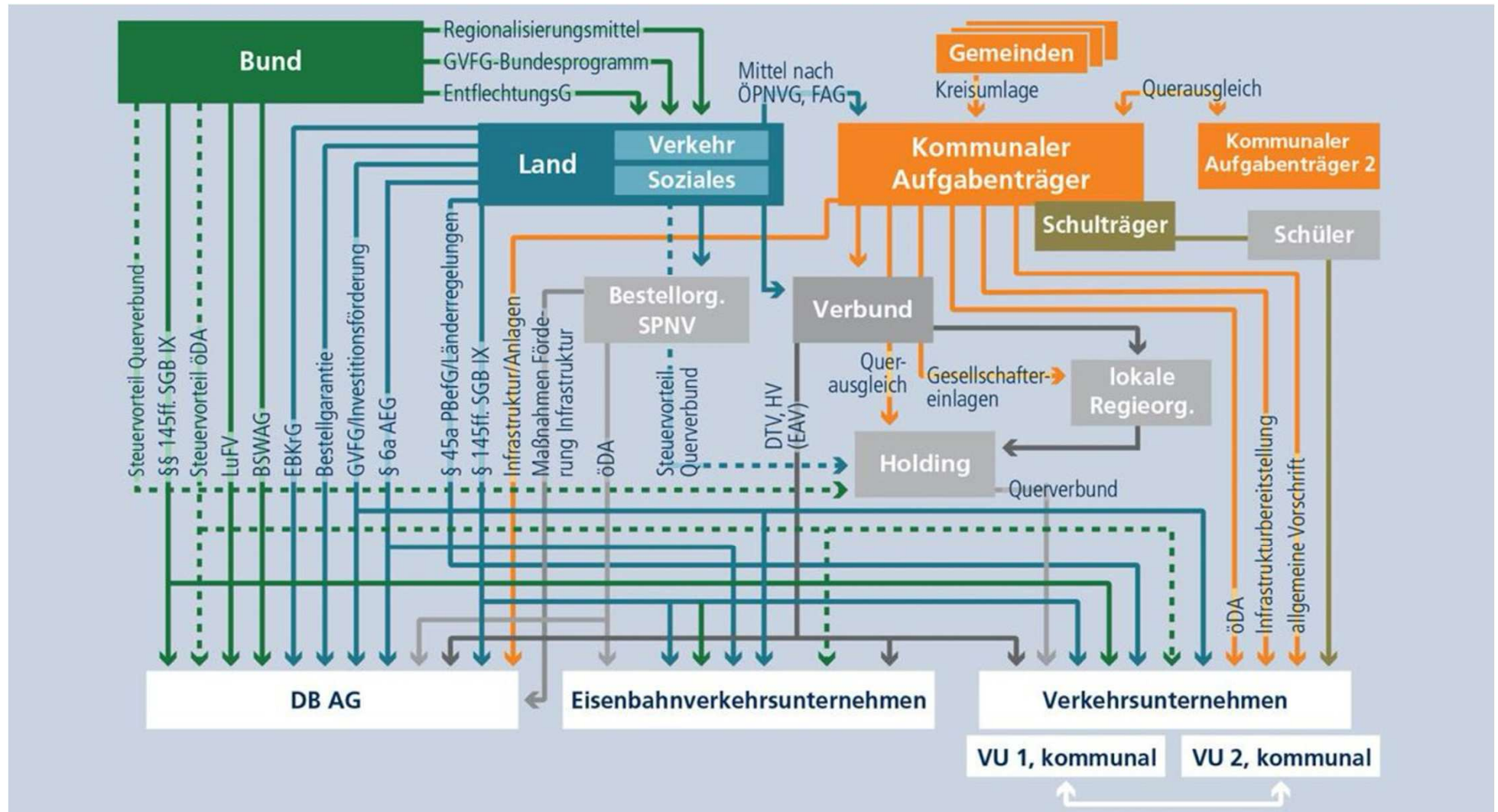


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Funding of Railway Infrastructure

The Money Thing

Funding of public transport (in Germany) – just very simple to explain?



The importance of long-term and constant funding plans

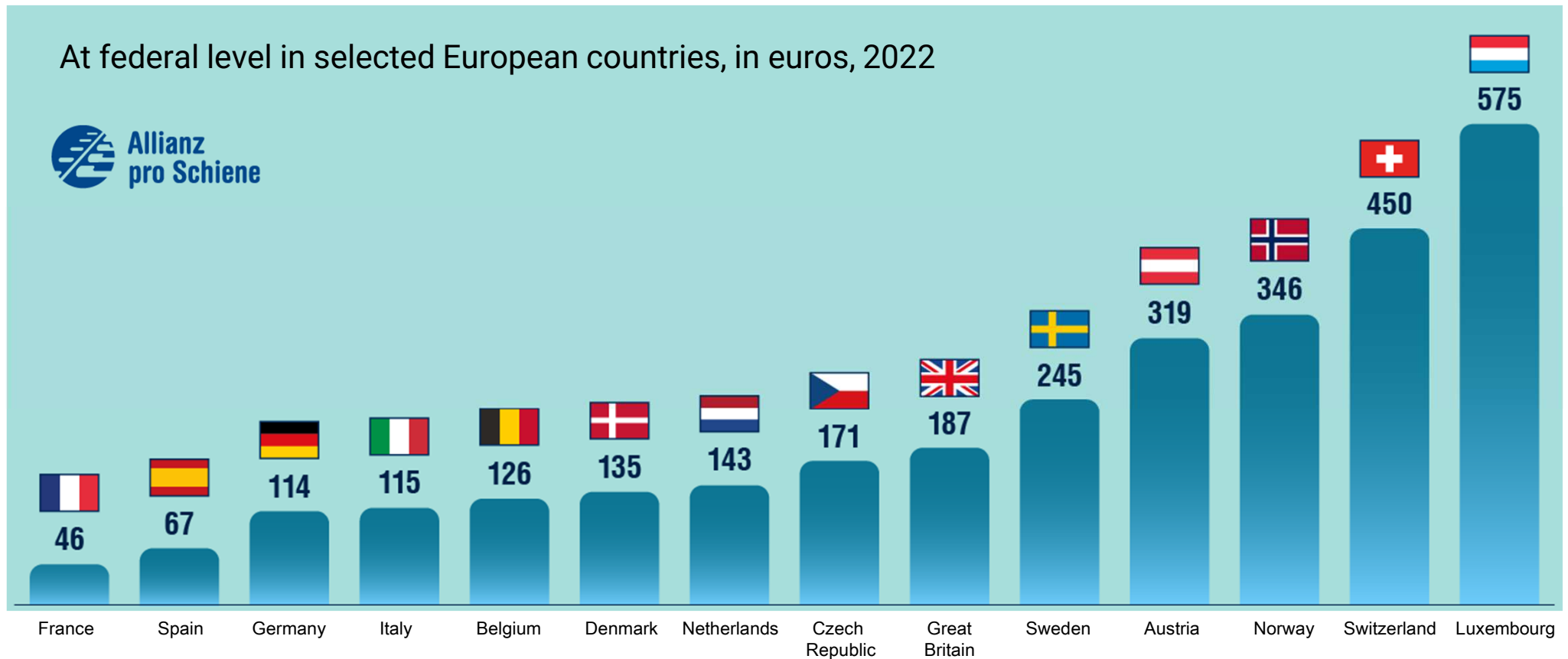
Basically, everywhere in Europe, the Railway – and even more the OLE-Industry needs an assured perspective of constant and reliable government infrastructure funding to establish in return:

- well-educated engineering and project management teams
- experienced installation teams who are able and willing to work days and nights, weekends and holidays, in heat, rain and cold, far away from.... ☺
- well developed fleet of special OLE machinery

A sudden and significant drop of railway funding in Germany in the early 2000s lead to a very long-term drop of available trained OLE personnel – where the business still doesn't have completely recovered from.

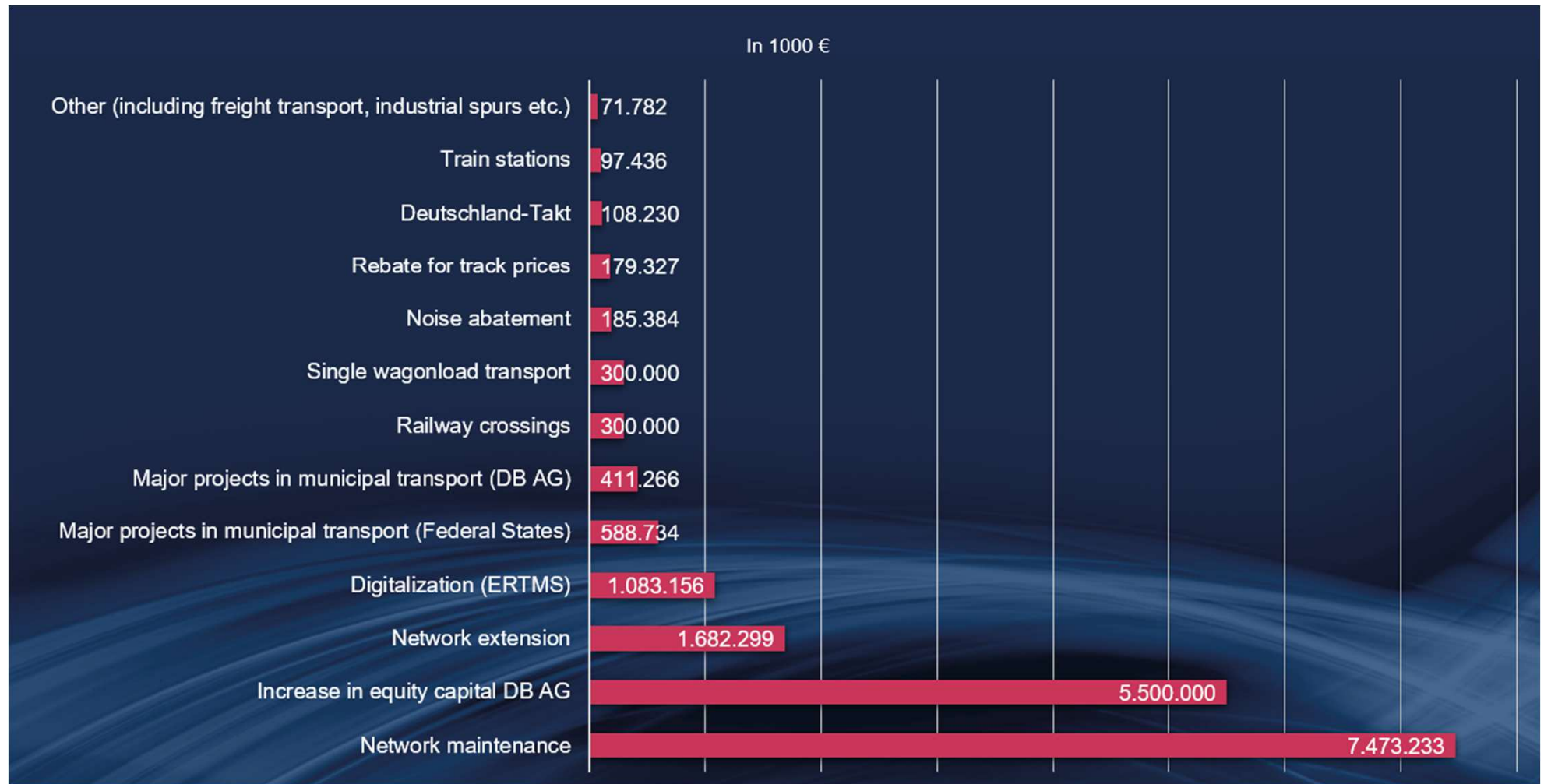
Per capita state investment in rail infrastructure

At federal level in selected European countries, in euros, 2022



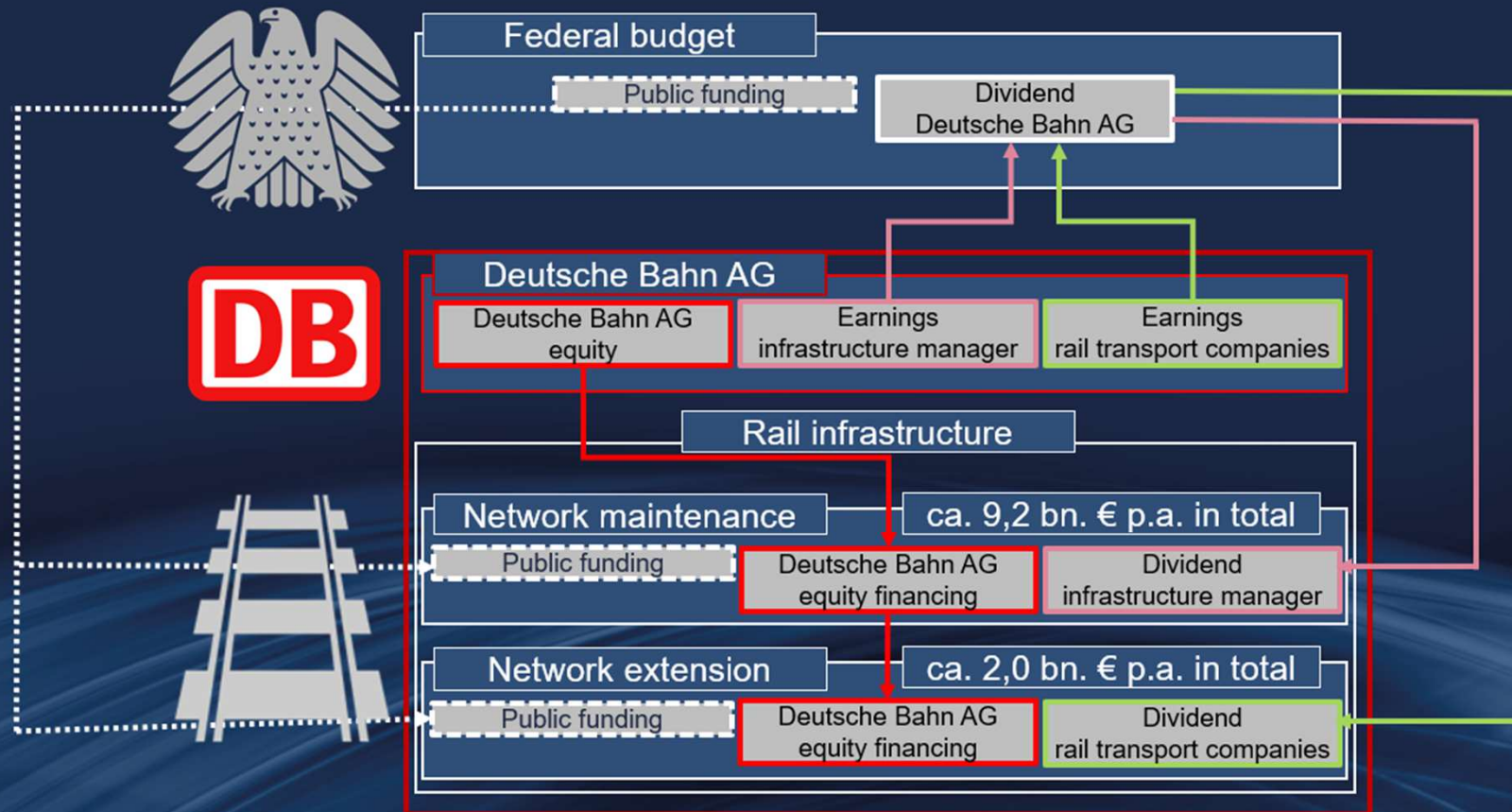
German Federal Budget 2024 – Rail

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Railway Infrastructure Financing in Germany

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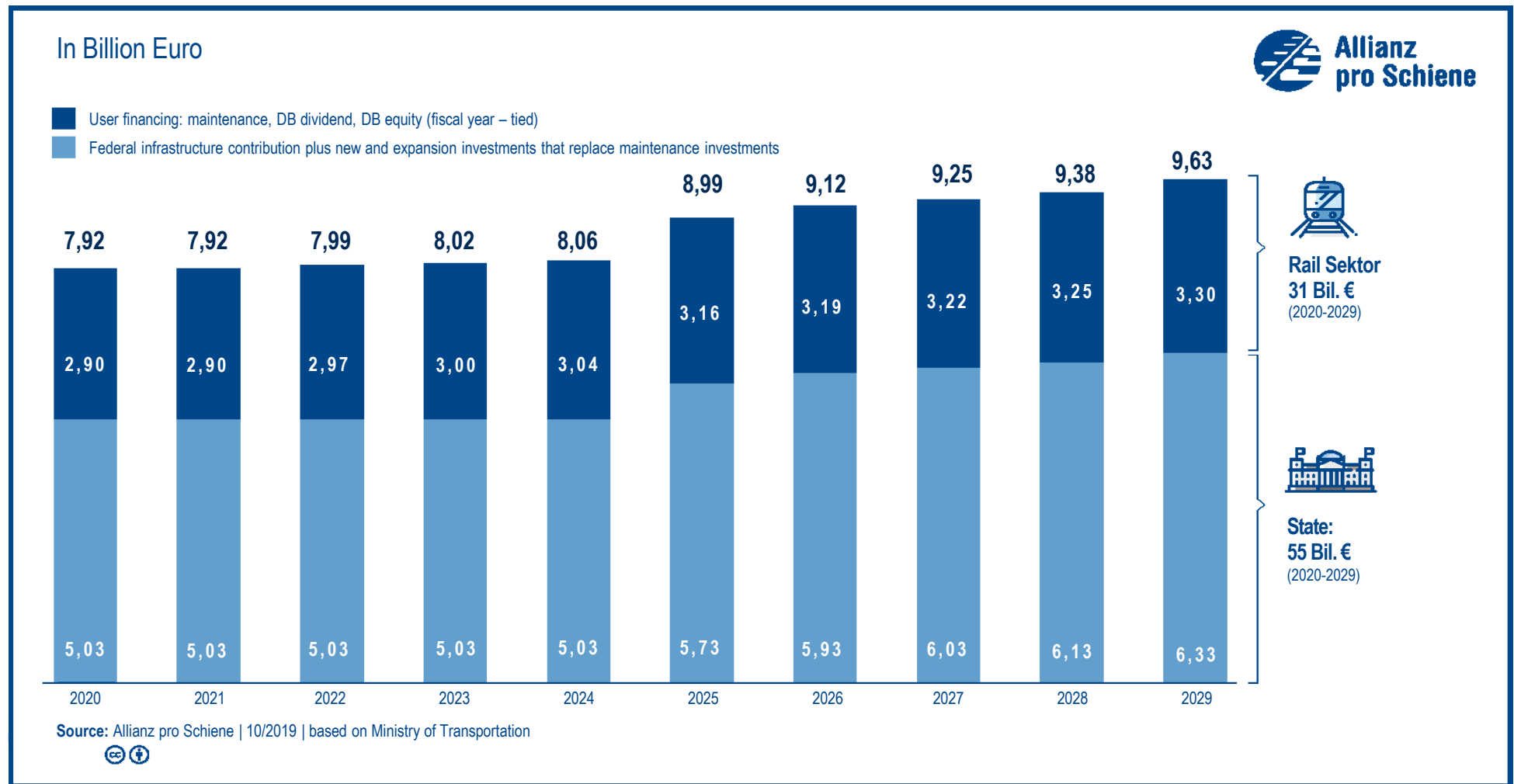
Many ways of funding railway infrastructure

- Germany has established two major funds – the Federal Railway Expansion Law (BSWAG) – and since 2009, the so called “Performance and Financing Agreement” LuFV.
- Before 2009 there were only individual and collective financing agreements for the existing railway network which did not provide much information for the industry about predictable long-term intentions and plans of the federal government funding railway projects.
- Since then, to keep federal railways in a condition that can be used without restrictions, the federal government concluded the LuFV with Deutsche Bahn for the first time. In this contract, the maintenance of the rail network was placed on a different basis: the government committed itself to providing Deutsche Bahn with a fixed annual earmarked sum for **replacement investments** in the existing network during the term of the LuFV contract.
- In return, the railway infrastructure companies must guarantee that they will provide the rail network with a predefined quality and that they will make their own investments to a defined minimum extent and carry out sufficient maintenance measures. Failure to achieve the set goals is subject to sanctions.

The funding commitment of LuFV

- After two terms of just five years, a third LuFV (III) was concluded in 2019 with a term of **ten** years.
- The extension from five to ten years of the agreement was an important progress in relation of having a long-term funding commitment. The extended term significantly improved planning reliability and made it easier for the industry in the OLE engineering and construction sector to build up the necessary design and construction capacities.
- Side-Note: after having more than 10 years of the agreement in force – some negative aspects have risen, too. Because only so-called “replacement investments” are funded through the federal contribution, some projects requiring just usual maintenance were postponed – whether on purpose or not – until they have fallen into the category of replacement.

Financial contributions to maintain the rail infrastructure





3

From Plan, Corridors and Alliances

The Thing about Realization

The actual situation – a press statement

“The European Football Championship in Germany has drawn international attention to the problems at Deutsche Bahn that have long been known in this country. The dilapidated German rail network is turning out to be a tough opponent for travelers in Germany during the European Championships, the New York Times recently wrote.

...

“In fact, we weren’t quite up to speed, our traffic at the European Championships wasn’t running smoothly,” said railway spokeswoman Anja Bröker on ARD TV Wednesday.

...

So far, six million people have traveled long-distance by train during the European Championships. »This is a huge rush of travel. But the infrastructure in Germany is old and outdated and not reliable, that was a challenge for us too,” said Bröker, explaining the problems.

Der Spiegel – 4th July 2024

Die Fußball-EM in Deutschland hat internationale Aufmerksamkeit auf die hierzulande längst bekannten Probleme bei der Deutschen Bahn gelenkt. Das marode deutsche Bahnnetz entpuppte sich als harter Gegner für Reisende in Deutschland während der EM, schrieb die »New York Times« kürzlich [↗](#). Besucher aus dem Ausland posteten in sozialen Netzwerken Fotos und Erlebnisse zu Pannen, überfüllten Bahnsteigen und Verspätungen.

Nach der deutlichen Kritik von Fußballfans hat die Bahn nun Defizite im Fernverkehr während der EM unter anderem mit Mängeln an der Infrastruktur erklärt. »Wir sind in der Tat nicht ganz auf der Höhe gewesen, unsere Verkehre bei der Europameisterschaft fuhren nicht rund«, sagte Bahnsprecherin Anja Bröker im ARD-»Morgenmagazin« am Mittwoch.

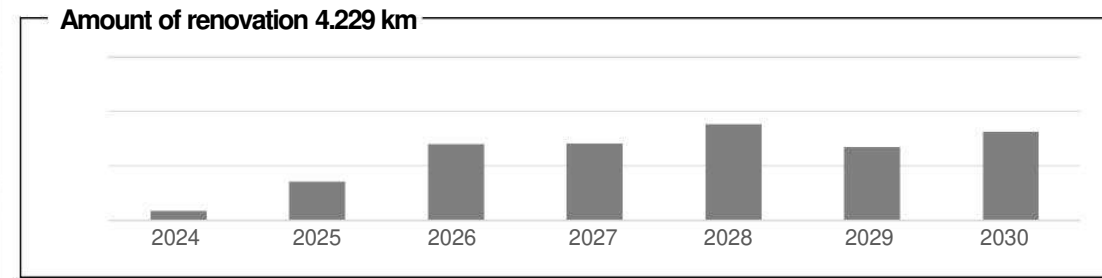
Es seien bislang sechs Millionen Menschen während der EM im Fernverkehr mit der Bahn unterwegs gewesen. »Das ist ein Riesen-Reiseansturm. Aber die Infrastruktur in Deutschland ist alt und in die Jahre gekommen und nicht zuverlässig, das war auch für uns eine Herausforderung«, sagte Bröker als Begründung für die Probleme.

Plans & High-Performance Corridors (or “The healing Code”)

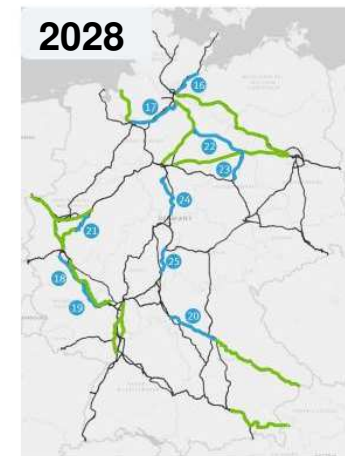
Communicated
and in
progress



Premise for traffic compatibility of the corridors: 5 months of total closure for each corridor; no placement of corridors between the timetable change and mid-February



Work status
from industry
as a recom-
mendation for
discussion
with the
federal
government



— Renovation — Renovation finished

Plans & High-Performance Corridors – what is it about?

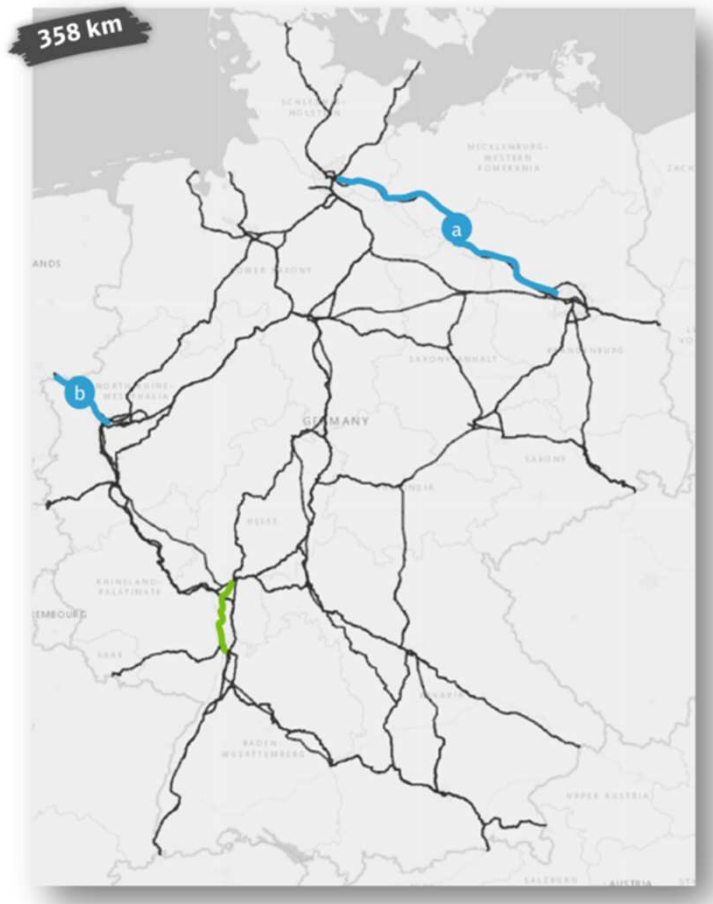
Problem:

- construction hinders traffic, traffic hinders construction
- gigantic backlog of replacement investments (around 90 billion EURO)

Solution:

- five months of complete closure of heavily used railway lines
- bundling Measures / over-renovation reduces closures and total costs
- 43 Sections from 07/2024 till 12/2030
- up to nine Sections per year - in spring and autumn
- 100 kilometres on average
- in total 4229 kilometers or 15% of the network

The idea of the High-Performance Corridors

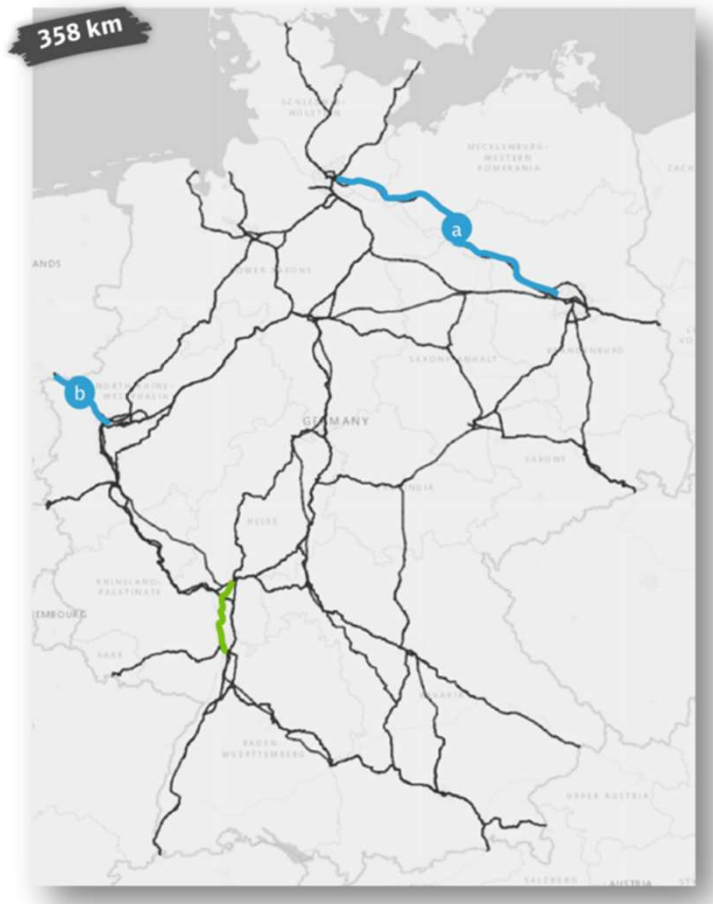


← It starts in 2024...



.... and it shall be finished by 2030 →

The idea of the High-Performance Corridors



← It starts in 2024...



.... and it shall be finished by 2030 →

FBQ (Fehmarn-Belt-Crossing) Alliance-Modell

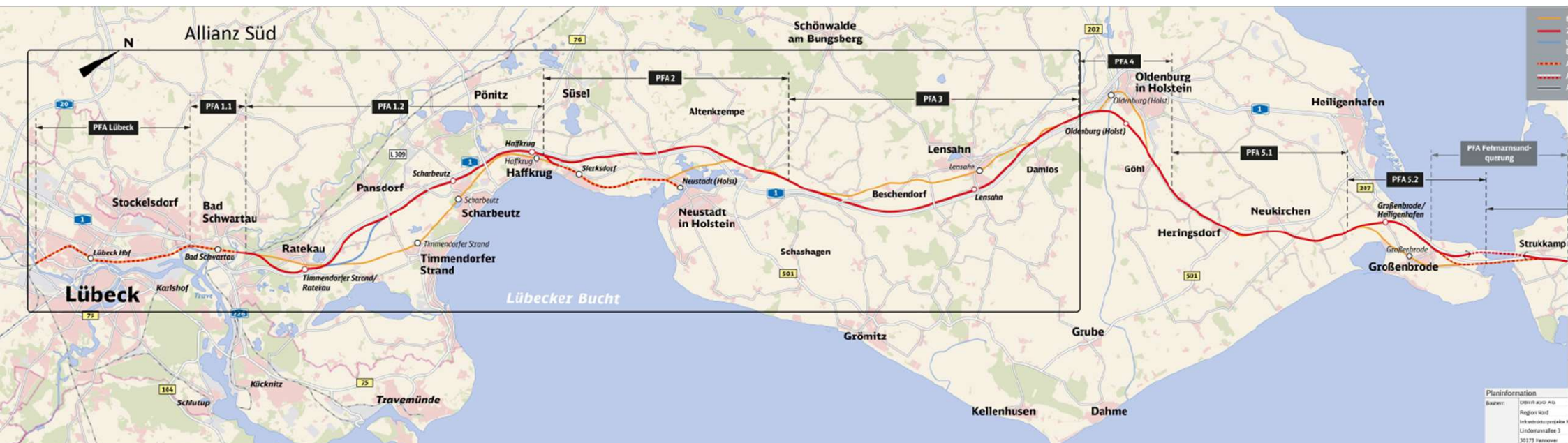
The cross-border Fehmarn-Belt-Link-Project is an important gap-closing for whole Europe in the Scandinavian-Mediterranean corridor, the longest core network corridor in the European transport network, which connects the large Scandinavian urban centers and ports with those in northern Germany and Italy.

DB InfraGO AG is therefore planning a high-performance rail connection between Lübeck and Fehmarn as a connection to the Fehmarn-Belt Tunnel, which is being built by Denmark.



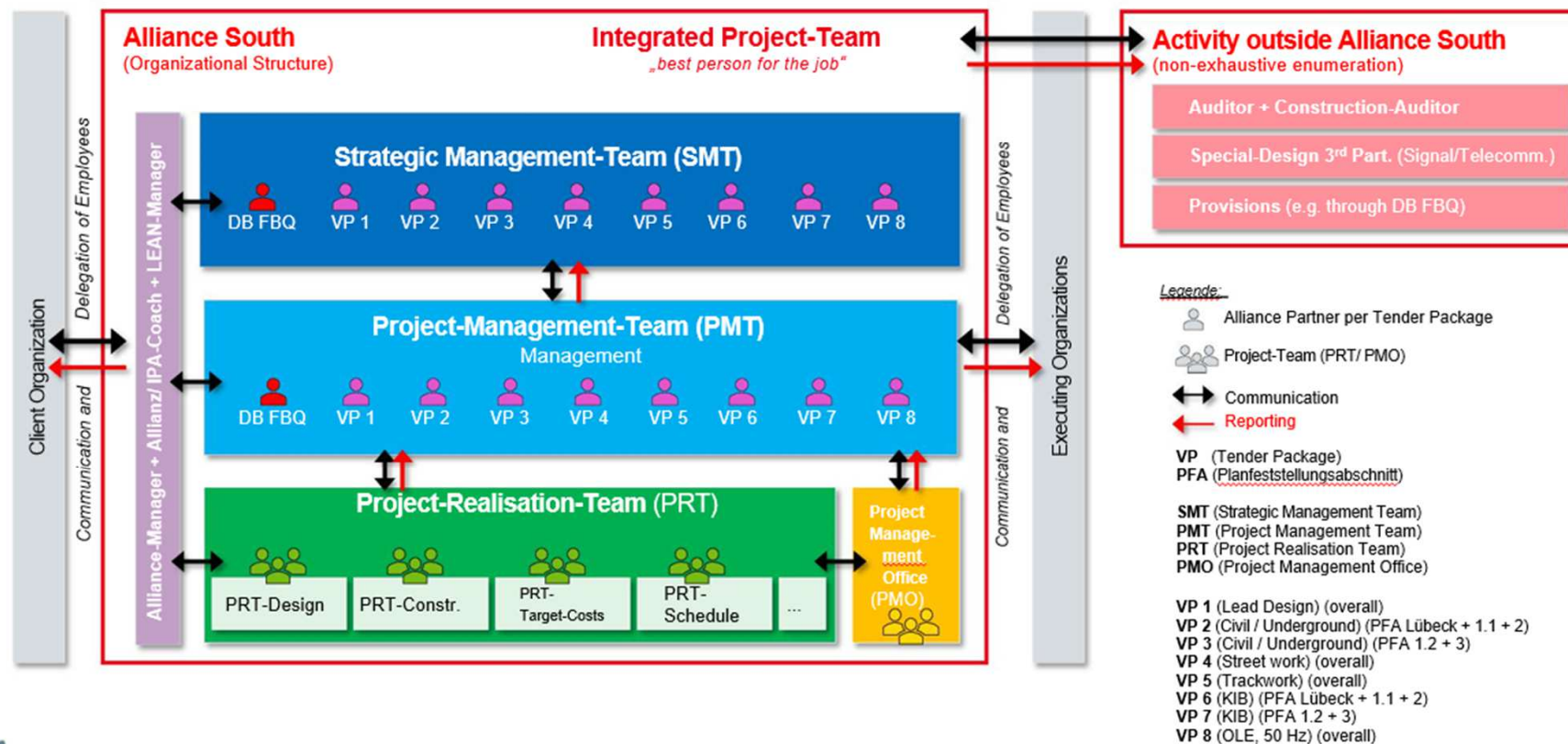
FBQ (Fehmarn-Belt-Crossing) Alliance-Modell

The project “Rail connection to the Fehmarn-Belt Fixed Link (FBQ)” includes the Design and Construction of a rail connection between Lübeck and Fehmarn and the associated connection to the Fehmarn-Belt-Tunnel. The project is anchored in a state treaty, which was signed by the transport ministers of Germany and Denmark in Copenhagen on September 3, 2008. The southern Part is now contracted to be realized in an Alliance-Model until 2029.



FBQ (Fehmarn-Belt-Crossing) Alliance-Modell

Organizational Structure of the Alliance South Basic organizational structure





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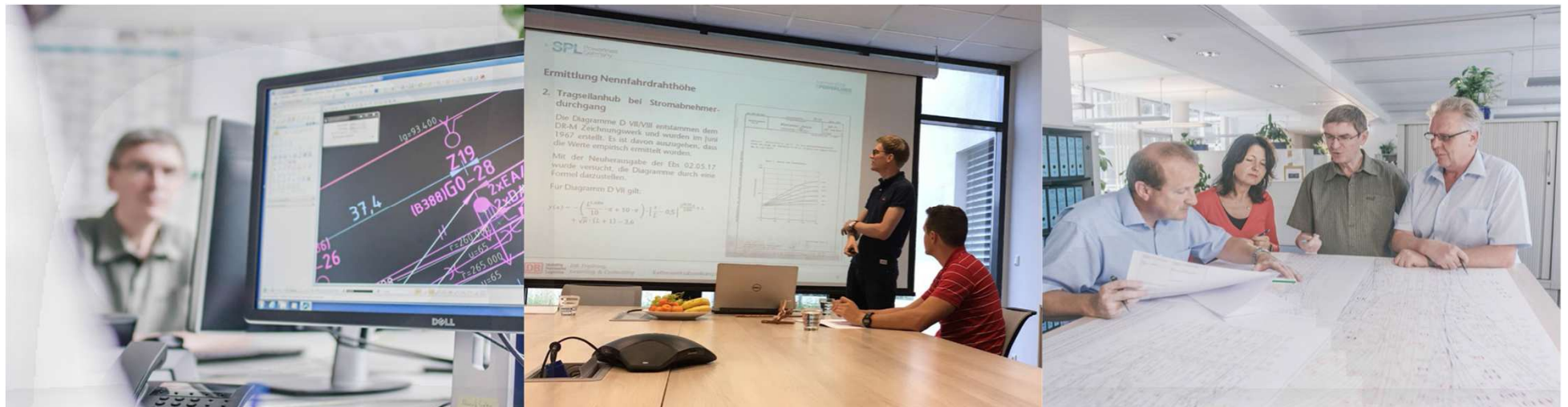
Recruiting and Training

The Future Thing

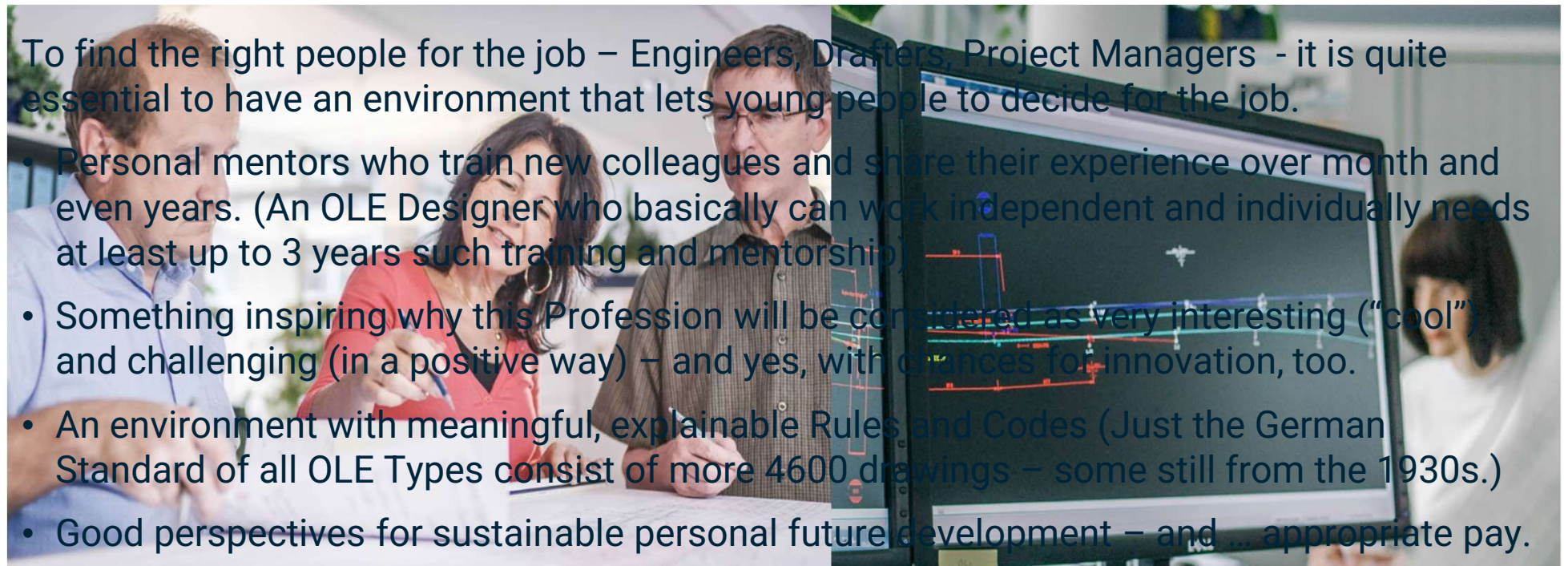
There's nothing like people

A major and ongoing challenge in increasingly aging societies is and will be the

- recruitment,
- education and training,
- and the ability to keep and inspire staff over the years and even decades.



Recruiting, Training and Development – but how?



To find the right people for the job – Engineers, Drafters, Project Managers - it is quite essential to have an environment that lets young people to decide for the job.

- Personal mentors who train new colleagues and share their experience over month and even years. (An OLE Designer who basically can work independent and individually needs at least up to 3 years such training and mentorship)
- Something inspiring why this Profession will be considered as very interesting (“cool”) and challenging (in a positive way) – and yes, with chances for innovation, too.
- An environment with meaningful, explainable Rules and Codes (Just the German Standard of all OLE Types consist of more 4600 drawings – some still from the 1930s.)
- Good perspectives for sustainable personal future development – and ... appropriate pay.

The mayor challenge for the OLE Business

Finding and recruiting young people for “the office” is already very challenging and will decide about a company’s future.

But it’ll be even much harder. Solutions for these questions decide basically about the OLE and railway business in general:

- How do we find the colleagues who will do the job outside
- often far away from families and friends – weekends, nights, summer, but winter as well, in all (un)suitable weather conditions thinkable?
- Who will do this job – when he or she becomes elder, if he or she cannot work on a platform at least five meters above ground?

Establishing training center for linesperson

Powerlines and other OLE companies established own training center for OLE installation with

- complete new training courses, manuals, lessons and facilities built from scratch.
- Side Note: SPL Germany has hired a retired military trainer from UK– we developed all these methods, standards, procedures, checks and test – all based on his decades of experience in training young people.



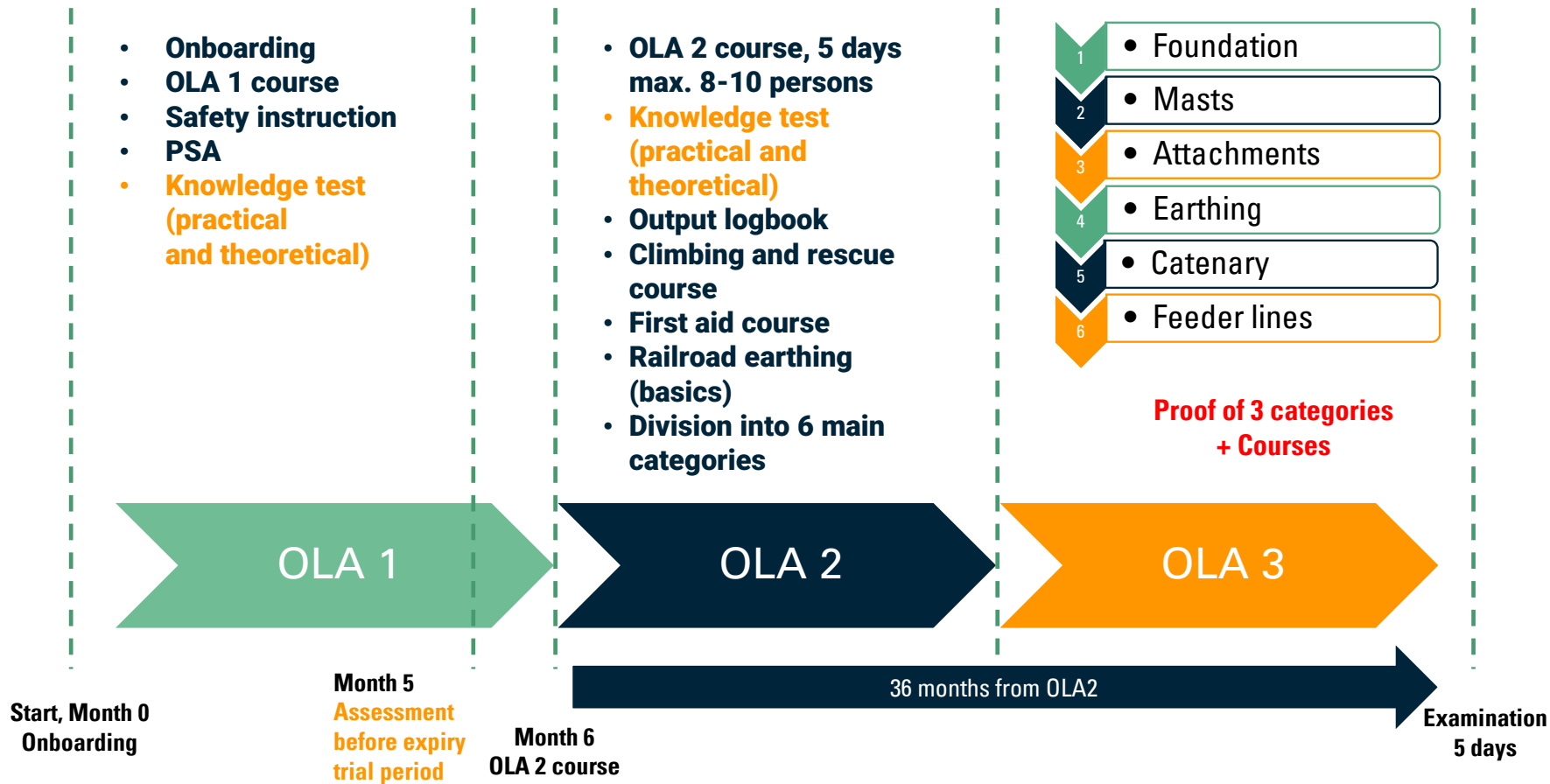
SPL training center – impressions



SPL training center – impressions



Example: Powerlines Training program for linesperson



Determination of qualifications and designations

- OLA1 → **Beginners** with authorization to enter OLA construction sites and work under supervision/instruction
→ Desired period 6 months
- OLA2 → **Assistant Linesperson** (Assembly activities under instruction and supervision)
→ Employees are assigned to a team and thus specifically introduced to the activities
→ Employees must keep a Logbook, where the independent performance of specified activities must be confirmed by the OM/BOM
→ Desired period 2-3 years (more realistic 3-5 years)
- OLA 3 → **Linesperson** (Assigned activities are carried out independently)
→ Employee provides the evidence via the Logbook
→ Assessors randomly check again whether the activities can be carried out with the appropriate quality
→ Desired period 1-2 years (more realistic 2-3 years)
- OLA 3+ → **Qualified Linesperson** (Direct and supervise assigned activities; Work Preparation)
→ Employee provides proof of Trainer OM's/BOM's statement
→ Desired period 1-2 years (more realistic 2-3 years)
- OLA 4/5 → **Supervising Linesperson**
→ Mitarbeiter provides proof of Trainer/OM's/BOM's/Project Manager Statement

Training – Guidelines & Keys

- **Reality** - Planning and implementing a training program that turns a person with no experience into a fully trained linesman. This means not only developing manual skills but is also focusing on values such as: Integrity - being able to rely on your teammates because you know they will treat you with respect and dignity and expect the same in return.
- **Teamwork** - When someone is part of a construction team, the ability to work together is paramount. This is a perfect example of "60 seconds" - whether it's clothing, tools or a job. Take the 60 seconds to make sure all teammates are safe and protected!
- **Discipline** - Very important, rules must be followed, a 25,000 Volt accident only happens once!!!
- **Loyalty** – OLE-companies shall be a good and fair employer, so loyalty is recognized by both sides.
- **Commitment** - this is crucial, a committed employee has the opportunity to work up to site manager level and even higher.





5

Relations OLE Industry, Deutsche Bahn & Government

A Question of Trust

Solving common challenges on a higher level

Training Initiative OLE 2024

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**Association of the
German Railway Industry**

1. Status Quo / Goal

- The “staying period” of future Linesmen in the industry will be reduced compared to the current situation (currently the industry still relies on employees with 30 – 40 years of service)
- Creation of the prerequisites for further vocational training - 3rd year of training - to become a “certified OLE linesmen” within a newly created industry standard → CIES – Catenary Industry Education Standard
- The prerequisite for participation is at least a technically completed occupation (2 years), such as industrial electrician, metal technology specialist, etc.

Training Initiative OLE 2024

2. Timeline of Training

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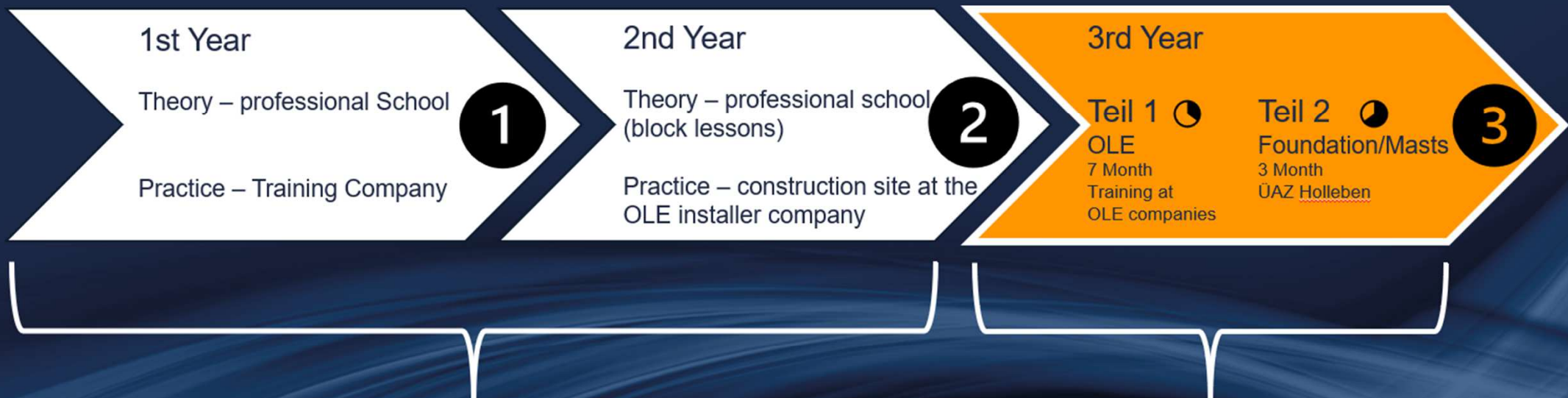
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**Association of the
German Railway Industry**

CERTIFIED OLE LINESMAN

two-year IHK-Education,
Industrial electrician/metal technology specialist

GESELLE



Vocational training with IHK-Certificate or
Career changers with same requirements

Further professional training
with CIES Certification

Training Initiative OLE 2024

3. Training Facilities OLE

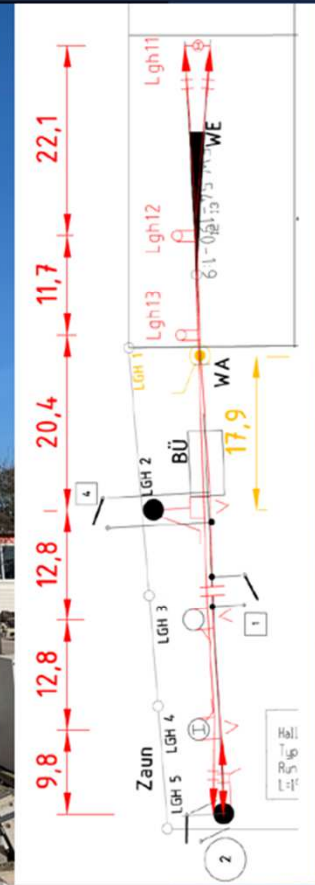
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**Association of the
German Railway Industry**



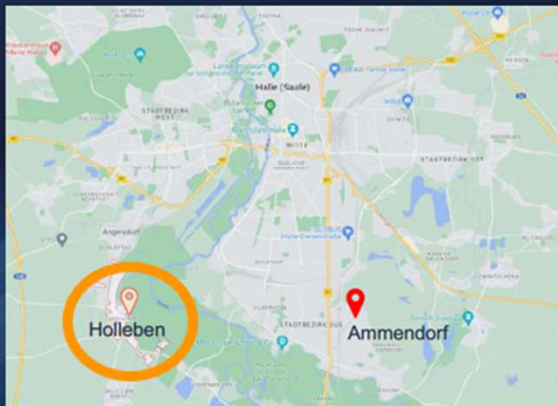
Training Center POWERLINES
Langenhagen



Training Initiative OLE 2024

5. Training Facility Foundation/Masts

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Structure and special features of the ÜAZ

- Inter-company training for all construction trades
- Outdoor area available for different types of foundations
- Boarding school available on site
- Prepared for Special Training OLE-Mast-Foundations
- Extendable for Special Training Installing OLE-Steel-Masts / Mast Fastening

Workshops Deutsche Bahn – with “Value Creation Partners”

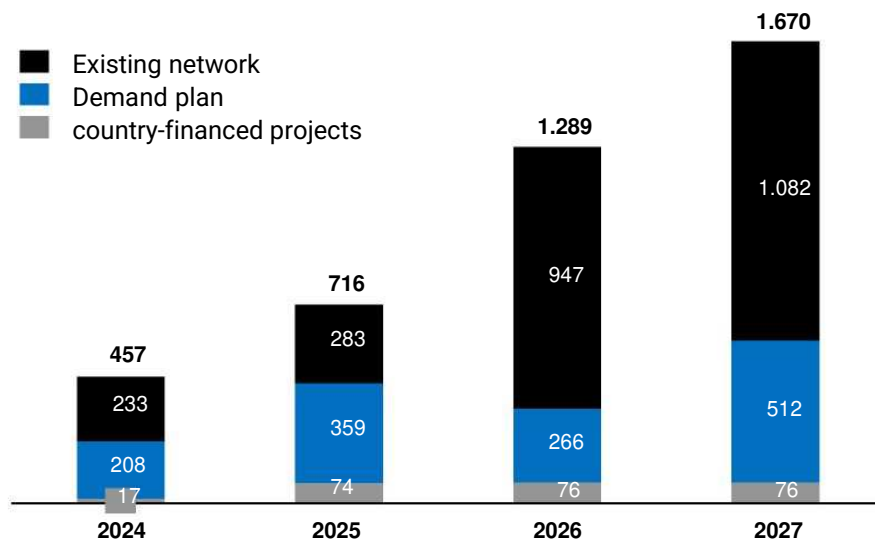


Requirements for building volumes renewal + Expansion and new construction per year

[Catenary length in km]

Vorbehalt
Haushaltsfreigabe
durch Bundestag

- Existing network
- Demand plan
- country-financed projects



Bestandserneuerung OLE

- Projekte + Zusammenhangsarbeiten inkl. Serviceeinrichtungen
- HLN-Korridore, Bedarf Bottom-up, Validierung ausstehend
- Hochleistungsnetz Rest, Flächennetz

Bedarfsplan OLA + Klimaschutzpaket

- Aktuell noch in Validierung durch Regionen
- Projekte BP
- Kleine und Mittlere Maßnahmen (KMM)
- Klimaschutzpaket (KSP)

Aus- und Neubau Länderfinanzierung

- Projekte GVFG
- Projekte LuFV 8.7

An aerial night photograph of a city, likely Amsterdam, showing a dense cluster of buildings with many lights on. The city is situated along a body of water, with the lights reflecting on the dark surface. The overall tone is dark and moody.

**Und 84,7 Millionen, die glauben,
dass wir scheitern.**

And 84.7 Million, who belief, that we fail.



**Powerlines is an enabler of green mobility
and the energy transition in Europe.**