2018 "One Belt and One Road" Rail Transport Forum

European Market Access Requirements and “4th Railway Package“

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European market access – 4th railway package

1	One-Belt-One-Road to Europe
2	European Rail system
3	4th Railway Package
4	European market access
5	European market access - TÜV Rheinland as partner

European market access – 4th Railway Package

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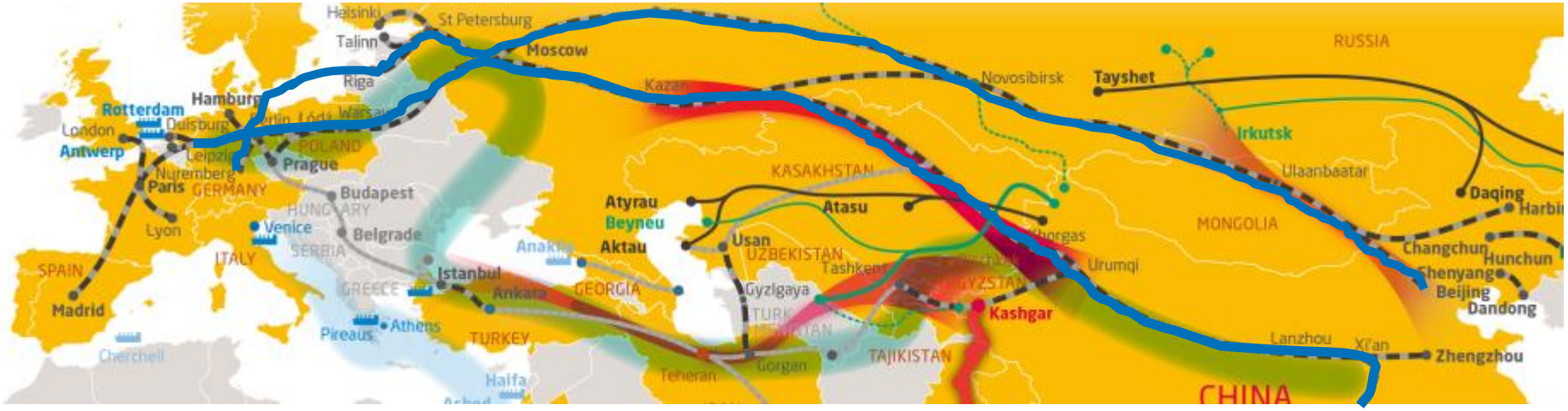
One-Belt-One-Road - to Europe, already existing!



In April 2015, the first regular cargo train departed from the southwestern city of Chongqing in China to arrive in Duisburg, Germany. It did so crossing the Chongqing-Xinjiang-Europe international line, which was established in 2011. What used to be a weekly service, had now become a service running three times a week. Since the start of this service, the number of trains going back and forth have quadrupled.

At the first stage of cooperation the parties will evaluate the possibility of expedited delivery of container cargo across the route China – Mongolia – port Baltiysk – port Rostock – terminals of Germany.

Sources: Railway Gazette

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One-Belt-One-Road – China interest

China and Gulf states discuss OTIF accession to support international freight

24 Apr 2018

INTERNATIONAL: China and the Gulf Co-Operation Council member states are discussing accession to the COTIF convention, which provides a legal framework for the operation of international rail traffic.

China's interest is related to the growth of east-west freight traffic to and from Europe. Its accession would be politically significant for the Intergovernmental Organisation for International Carriage by Rail which manages COTIF, the head of OTIF's Technical Interoperability Department Bas Leermakers told *Railway Gazette International* at the EUMedRail conference on April 24. OTIF has traditionally had its roots in western Europe, and while it works on a principle of 'one country, one vote', China could have significant influence.

The GCC states are interested in accession because they will need to establish a suitable legal framework as rail networks in the region expand and eventually connect, and COTIF provides ready-made system proven in Europe and elsewhere over 125 years.

COTIF is also working on a new appendix governing safety. This would be compatible with EU requirements, enabling countries which neighbour EU member states to align themselves with members. It could also be of use to countries further afield looking to standardise.

OTIF and the Universal Postal Union have formed a working group to develop rules for carrying postal traffic by rail.

Leermakers said the legal frameworks governing other modes of transport, including air and shipping, have specific exclusions for postal traffic, which is transported under the UPU's dedicated rules rather than mode-specific ones. This affects issues such as customs inspection. However, COTIF does not have this exemption, complicating the carriage of post by rail. Changing the convention would be complex, and so the group is studying possible options.

The current legal framework is not in practice hindering growth in the sector, Leermakers said, with the boom in e-commerce generating significant parcels traffic between China and Europe.

Sources: Railway Gazette

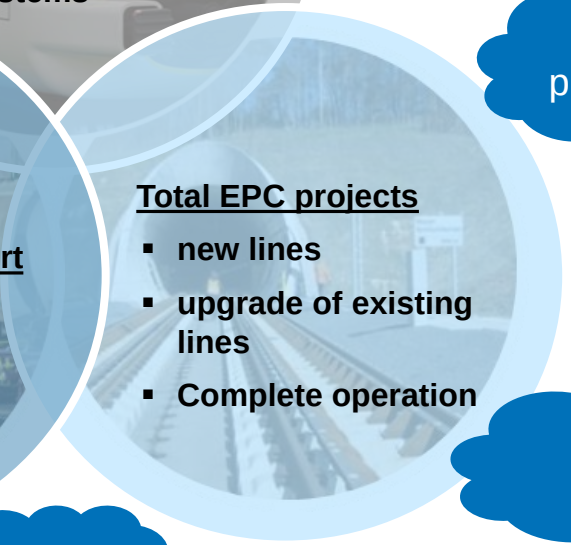
One-Belt-One-Road – European market

Considerations !

Chinese interests on the European market?

Export products
- **Rolling stock**
- **Rolling stock Components**
- **Infrastructure systems**

Growing freight transport on silk road between Europe and China



Total EPC projects
- **new lines**
- **upgrade of existing lines**
- **Complete operation**

Regulated in EU Rail system

Local production

Technical requirements

Maintenance

RAMS / LCC

Service workshops

Authorisation processes

Legal conditions

Tender processes

RU partners

Local representation

Operation conditions

Financial capacity

Suitable rolling stock

Logistics

EPC = Engineering, Procurement, Construction

RU = Railway undertaking (operator)

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European market access – 4th Railway Package

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European Rail System - Definitions

”Making the Railway System Work Better for Society”

Community Rail System[1] also called **Railway System**[2] or **Rail System**[3]

covers all rail-bound systems within the European Community

e.g. DB, SNCF, RATP, KVB others

[1] *Reference: DIRECTIVE 2004/49/EC, (4)*

[2] *Reference: DIRECTIVE 2004/49/EC, (5)*

[3] *Reference: DIRECTIVE 2008/57/EC, Article 1.1 and 2016/797/EC*

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European Rail System - Exceptions

- metros; trams and light rail vehicles, and infrastructure used exclusively by those vehicles;
- networks that are functionally separate from the rest of the Union rail system and intended only for the operation of local, urban or suburban passenger services, as well as undertakings operating solely on those networks.

<u>Member states may exclude:</u>

- privately owned railway infrastructure and vehicles exclusively used on such infrastructure that exist solely for use by the owner for its own freight operations;
- infrastructure and vehicles reserved for a strictly local, historical or touristic use.
- light rail infrastructure occasionally used by heavy rail vehicles under the operational conditions of the light rail system, where it is necessary for the purposes of connectivity of those vehicles only;
- vehicles primarily used on light rail infrastructure but equipped with some heavy rail components necessary to enable transit to be effected on a confined and limited section of heavy rail infrastructure for connectivity purposes only.
- *Reference : DIRECTIVE 2016/797/EC Article 1; 3,4*

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European Rail System - Directives

New Approach and the Global Approach

DIRECTIVE 2016/798/EU — recast of — DIRECTIVE 2004/49/EC (still in force)

Railway safety

Safety first !

REGULATION (EU) No. 402/2013
on the common safety method for risk evaluation and assessment (CSM-RA)
incl. amendment (EU) No. 1136/2015

REGULATION (EU) No. 445/2011
on a system of certification of entities in charge of maintenance for freight wagons (ECM)

DIRECTIVE 2016/797/EC — recast of — DIRECTIVE 2008/57/EC (still in force)

Interoperability
of the rail system within the European Union

Transition period 3 years (2016 -2019)

Subsystems

TSIs (EC Decisions)

Interoperabilty constituents

Completion of the unitary European railway sector - Elimination of remaining technical barriers !

European Rail System - Safety related EU Directive

‘Railway Safety’ Directive

“…lays down provisions to ensure the development and improvement of the safety of the Union rail system and improved access to the market for rail transport services ability of a rail system to allow the safe and uninterrupted movement of trains”

Focusing on Operation !

Based on safe subsystems!

“ It covers safety requirements for the system as a whole, including the safe management of infrastructure and of traffic operation and the interaction between **R**ailway **U**ndertakings, **I**nfrastructure **M**anagers and other actors in the Union rail system. “

SMS
(Safety management system)
for RU, IM




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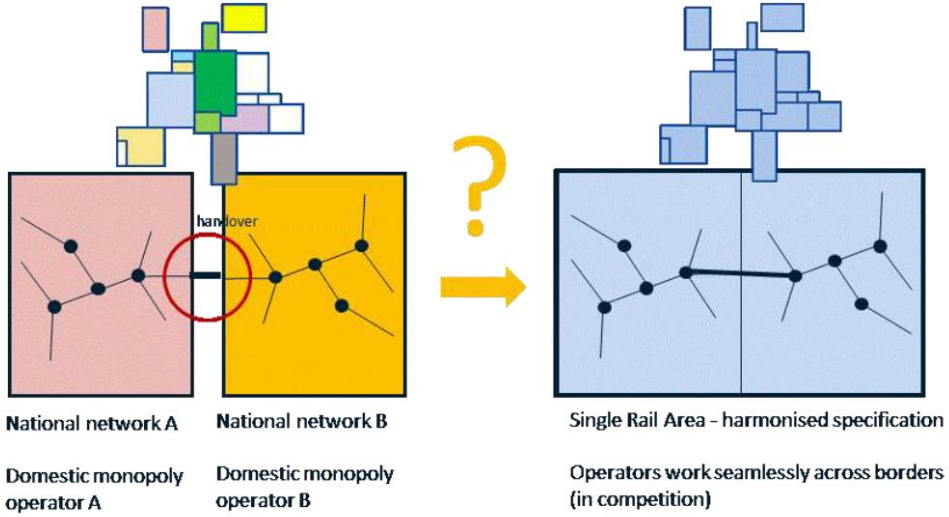
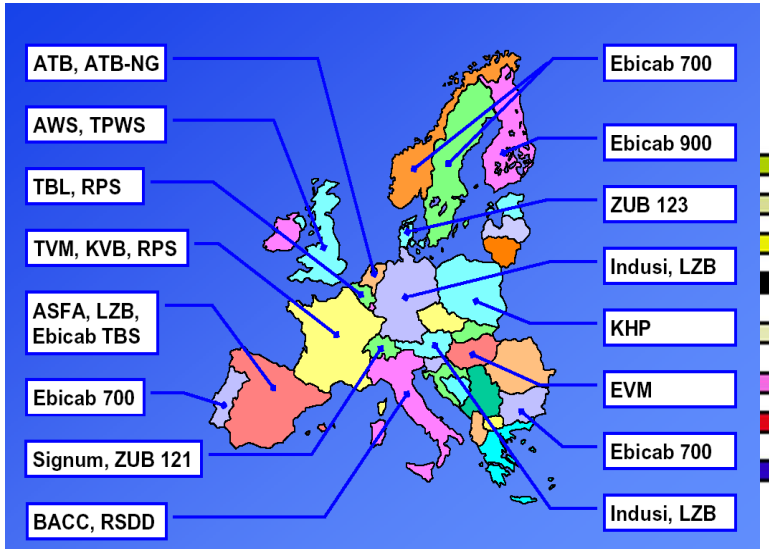
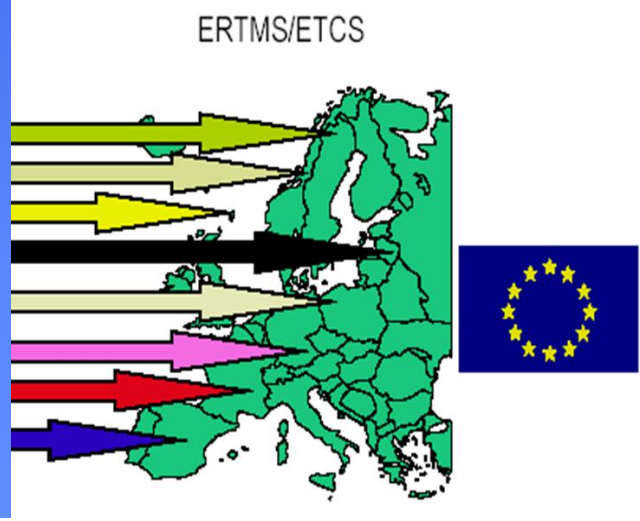
European Rail System – Interoperability Directive



Target: Single area with seamless cross border operation in competition!

Single area: harmonised specification = Interoperability!





Example: Train Protection and Control Systems within Europe today and in future!

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European Rail System - Interoperability Directive

‘Interoperability’

- “ability of a rail system to allow the safe and uninterrupted movement of trains”

- This ability depends on all the regulatory, technical and operational conditions which must be met in order to satisfy the essential requirements”:
  - **safety**
  - reliability and availability
  - health
  - environmental protection
  - technical compatibility
  - accessibility





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European Rail System - Interoperability Subsystems

Rail system is broken down in following subsystems, either

Structural Subsystems

- Infrastructure (INF)
- Energy (ENE)
- Control-command and signalling (CCS -OB, -OT)
- Rolling stock (RST) incl. Noise

or

Functional Subsystems

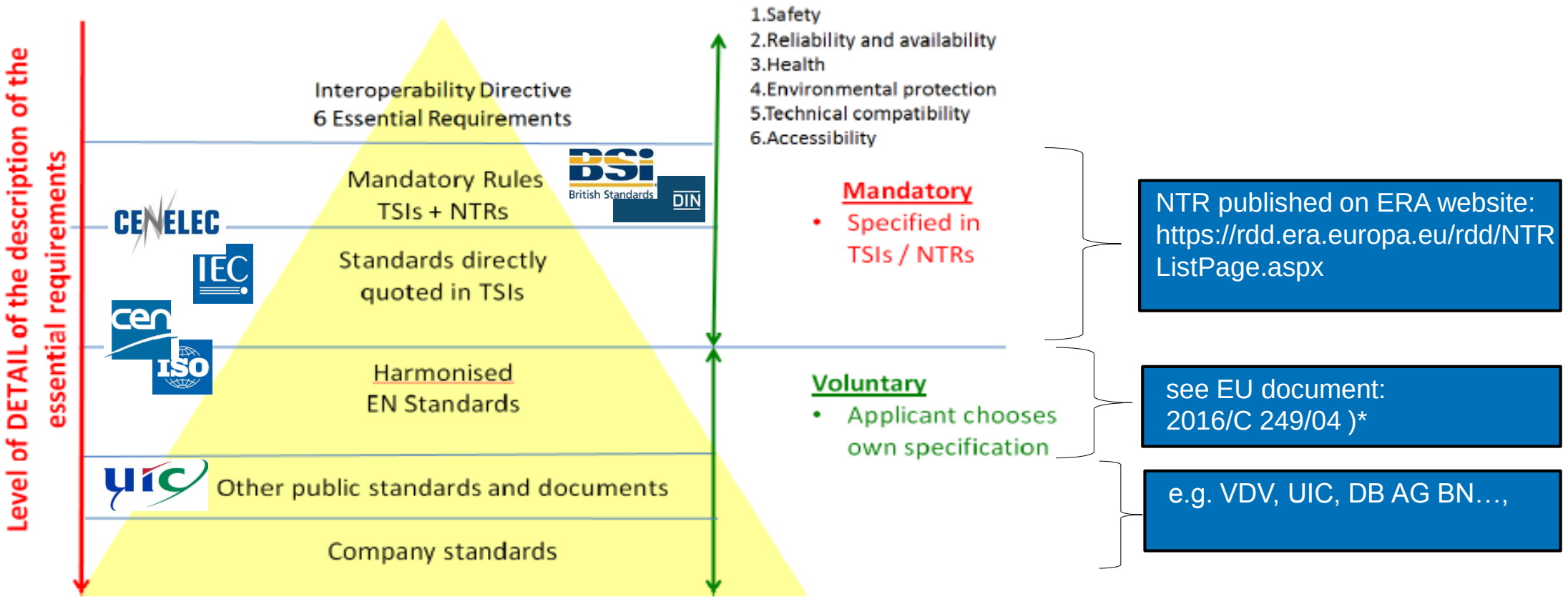
- Operation and traffic management (OPE)
- Telematics applications for passenger services (TAP)
- Telematics applications for freight services (TAF)

and

Common TSIs

- People reduced mobility (INF, RST, OPE, TAP)
- Safety Railway tunnel (INF, CCS, RST, OPE, ENE)

European Rail System Interoperability – Hierarchy of Standards



)* http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=OJ%3AC%3A2016%3A249%3ATOC

NTR: National Technical Rules
TSI: Technical Specification for Interoperability

European Rail System Interoperability – Example Rolling stock

2011/291/EU
TSI LOC & PAS CR

2008/232/EU
TSI RST HS

TSI LOC & PAS

COMMISSION REGULATION
(EU) No 1302/2014 of 18 November 2014
Technical specification for interoperability relating to the 'rolling stock — locomotives and passenger rolling stock' subsystem of the rail system in the European Union

Relevant for Rolling stock:

- TSI Loc&Pas (including TSI SRT)
- TSI PRM
- TSI Noise
- TSI CCS (onboard equipment)

\+ NNTR

Member States: FI - Finland

Basic Parameters List: 2015/2299/EU

TSIs: Directive 2008/57/EC

National Technical Rules

Mandatory	MS	Basic Param.	Legal text Title in English	National Technical Rule
Rule	FI	3.2.1	FI NRD	TRAFI/15083/03.04.02.00/2013, III part, clause 1.1.1
Rule	FI	3.3.2	FI NRD	TRAFI/4690/03.04.02.00/2014 clause 2.2.2 cover Specific case 7.3.2.26 LOC & PAS TSI 1302/2014

https://rdd.era.europa.eu/rdd/NTRListPage.aspx

European Rail System Interoperability – TSI LOC&PAS – Requirements

Essential Requirements linked to each specification

Technical requirements defined as with concrete conditions or linked to standards

Functional safety Requirements with **CSM risk assessment** for five items explicitly defined in TSI LOC&PAS:

- 4.2.3.4.2 Active systems for running dynamics
- 4.2.4.2.2 Emergency / Parking brake
- 4.2.5.3.5 Passenger alarm
- 4.2.5.5.8 Passenger doors unlocked
- 4.2.5.5.9 Passenger doors emergency opening

Electronic devices and software with safety functions shall be developed and assessed by adequate methodology (*e.g. EN 50128 / 29)*

Rolling stock elements corresponding to essential requirements

Note: only points in Section 4.2 which contain requirements are listed

Ref. Point	Element of the rolling stock sub-system	Safety	Reliability-Availability	Health	Environ-mental protection	Technical compati-bility
4.2.2.2.2	Inner coupling	1.1.3 2.4.1				
4.2.2.2.3	id coupling	1.1.3 2.4.1				
4.2.2.2.4	Rescue coupling		2.4.2			2.5.3
4.2.2.2.5	Staff access for coupling and uncoupling	1.1.5		2.5.1		2.5.3
4.2.5.3	Passenger alarm	2.4.1				
2.5.4	Comm ication devices for sse gers	4.1				
4.2.5.5	Ext ior doors: access to and eg s from Rolling stock	2.4				
4.2.5.6	Exte r doors: system const tion	1.3 2.4.1				

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European Rail System Interoperability – TSI LOC&PAS – Requirements

Technical requirements defined as with concrete conditions or linked to standards → NoBo assessment

Functional safety Requirements with **CSM risk assessment** for five items explicitly defined in TSI LOC&PAS:

- 4.2.3.4.2 Active systems for running dynamics
- 4.2.4.2.2 Emergency / Parking brake
- 4.2.5.3.5 Passenger alarm
- 4.2.5.5.8 Passenger doors unlocked
- 4.2.5.5.9 Passenger doors emergency opening

→ Requires separate CSM assessment Body (AssBo) report as input for NoBo!

Electronic devices and software with safety functions shall be developed and assessed by adequate methodology (*e.g. EN 50128 / 29*) → Separate certifications for safety related SW & HW to present

National Notified Technical Rules (NNTR) + → DeBo assessment

European Rail System Interoperability - CSM RA

"The CSM (Common Safety Methods) on risk evaluation and assessment shall apply to any change of the railway system in a Member State…, which is considered to be significant….

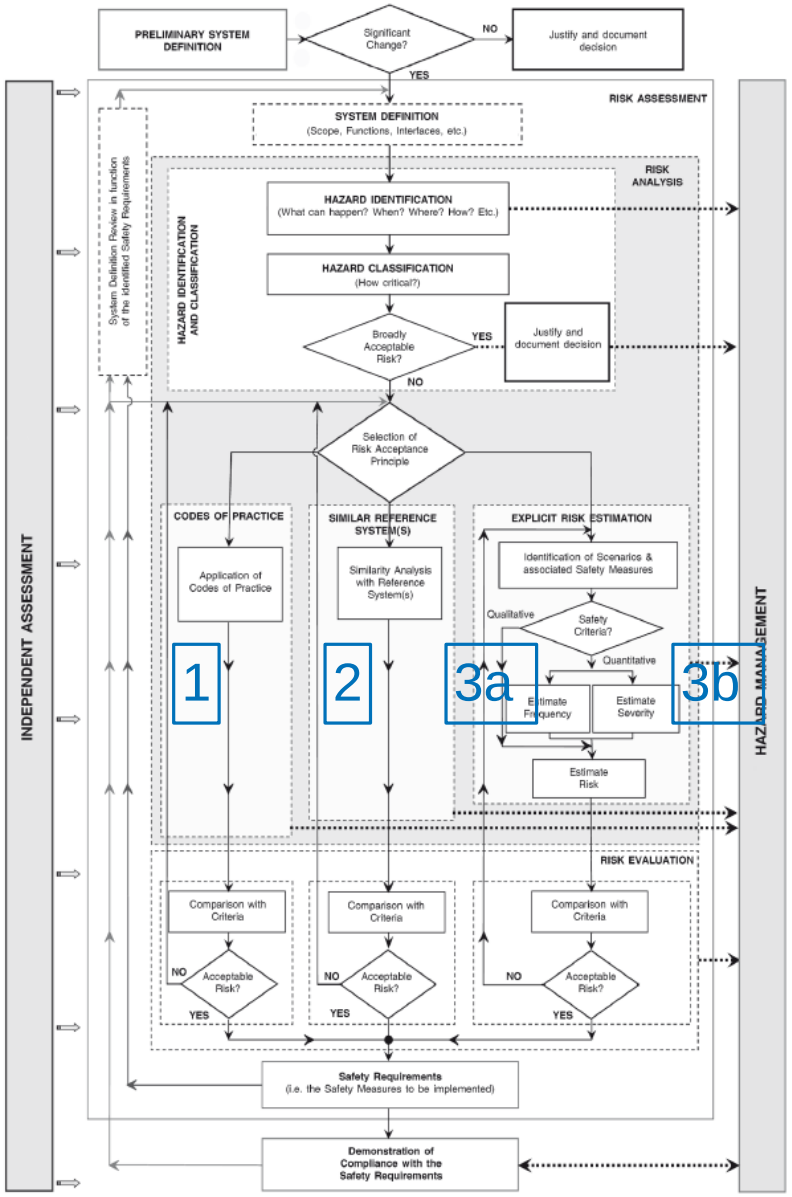
Those changes may be of a technical, operational or organisational nature…."
Reference: REGULATION (EC) No 402/2013, Article 2, 1.

"The CSMs shall describe how the safety level, and the achievement of safety targets and compliance with other safety requirements, are assessed by elaborating and defining:
(a) risk evaluation and assessment methods"
Reference: DIRECTIVE 2004/49/EC, Article 6, 3., (a)

Risk Acceptance Principles

- 1 Code of Practice,
- 2 Reference system
- 3a Qualitative Risk Assessment (e.g. hazard will occur often)
- 3b Quantitative Risk Assessment (e.g. failure / 10^{-9} hours)

In principle all permitted, BUT choose „right tool for the job!"



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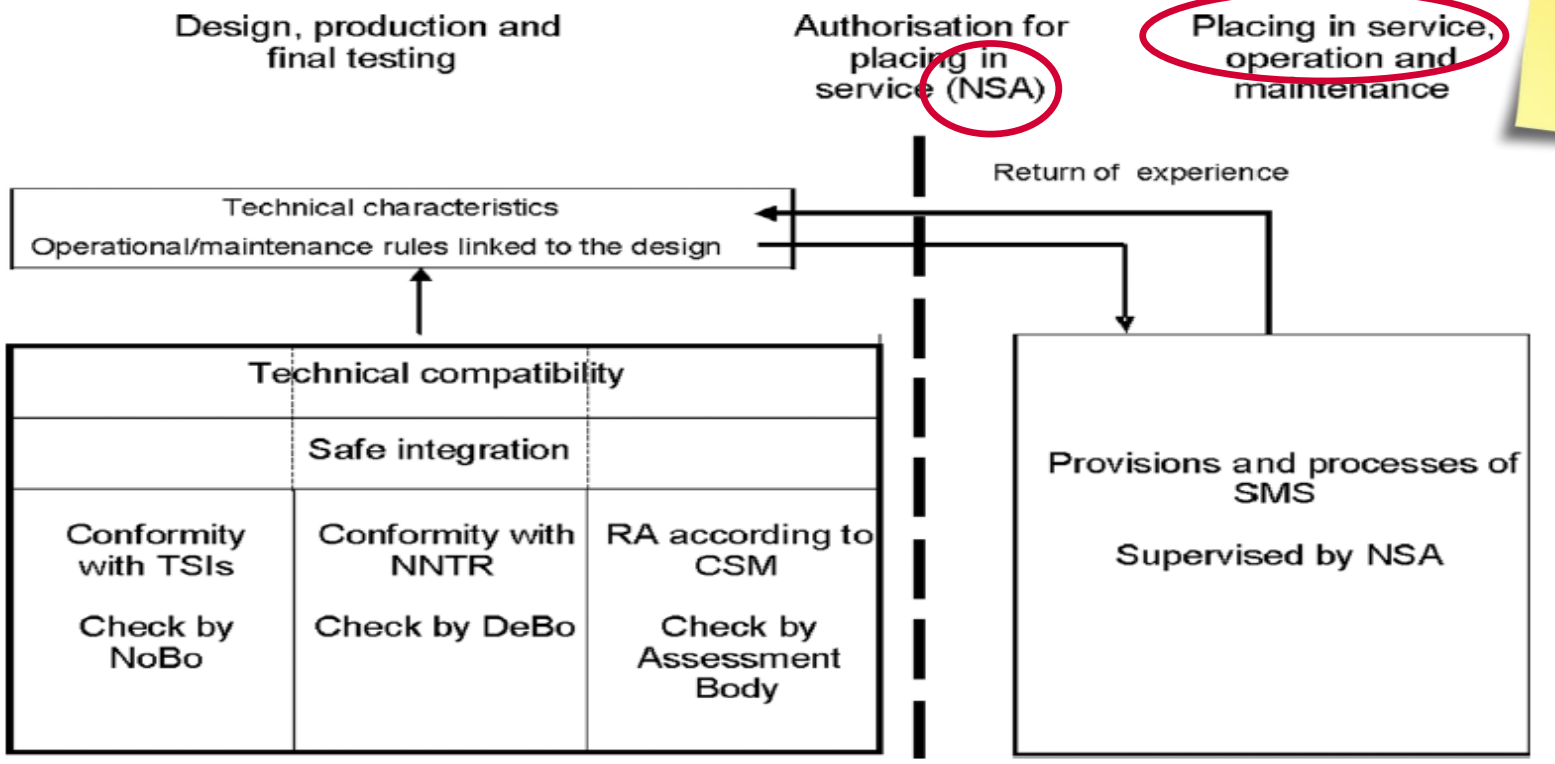
Process of Placing in Service for Subsystems – 2008/57/EC

NoBo/DeBo/AsBo: safe integration, placing in service

From a general point of view Directive 2008/57/EC regulates the technical characteristics (mainly design, production and final testing) of the subsystems and vehicles and the process of their authorisation for placing in service and Directive 2004/49/EC regulates the entities that use, operate and maintain them, as shown in the following diagram.



EU recommandation for Placing subsystem in Service:

2014/897/EU

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European market access – 4th Railway Package

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4	European market access
5	European market access - TÜV Rheinland as partner

European Rail System – 4th Railway Package


Official Journal
of the European Union
L 138
Volume 59
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English edition
Legislation
Contents
I Legislative acts
REGULATIONS
* Regulation (EU) 2016/796 of the European Parliament and of the Council of 11 May 2016 on the European Union Agency for Railways and repealing Regulation (EC) No 881/2004 (1) 1
DIRECTIVES
* 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 (1) 44
* Directive (EU) 2016/798 of the European Parliament and of the Council of 11 May 2016 on railway safety (1) 102

In force since June 2016

EUROPEAN UNION AGENCY FOR RAILWAYS

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European Rail System – 4th Railway Package

Key elements:

After 3 years transition period ERA (EU Agency for Railways) will issue uniform throughout Europe:

- Rolling stock Authorisation
- Safety certificates for manufacturer and operator

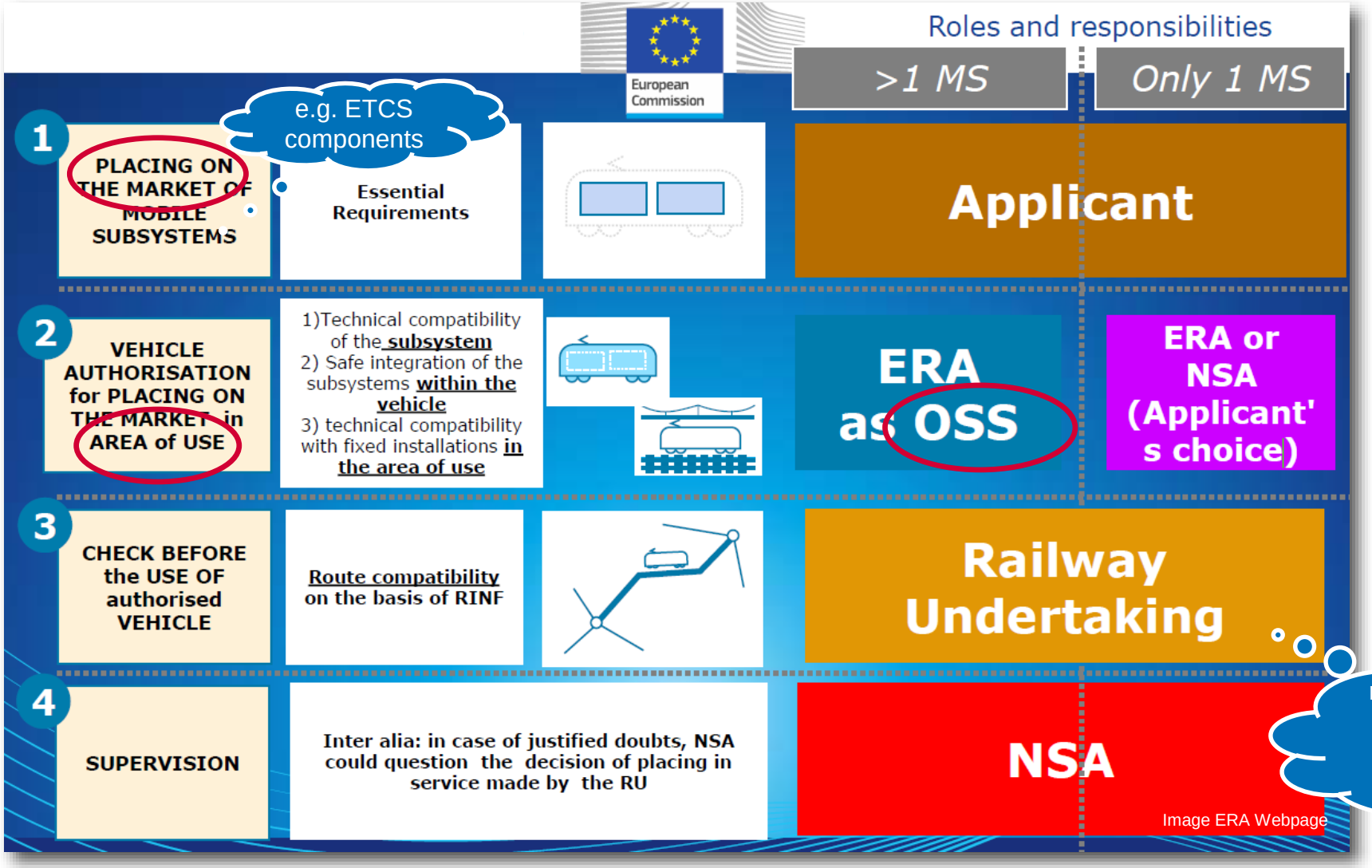
Authorization for the Agency to issue the necessary authorization to the national authorities for the ERTMS infrastructure projects

(binding assessment of ERTMS specifications)

The agency will develop the so-called One-Stop-Shop in order to implement these tasks effectively.

Source: ERA

Process PLACING IN SERVICE for Rolling stock (new framework 2016/797/EU)



PLACING IN SERVICE:
all operations to put a subsystem in its operational service (Art. 2)

New key words (Art.2):

PLACING ON THE MARKET
first making available on the Union's market of an interoperability constituent, subsystem or vehicle ready to function in its design operating state

AREA of USE
network or networks within a Member State or a group of Member States in which a vehicle is intended to be used

ONE STOP SHOP (OSS)

register of infrastructure (RINF) shall be used to check the vehicle / network compatibility

Source: ERA

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Process of Placing in Service for Rolling stock (new framework 2016/797/EU)

New process according to 4th railway package (due date 19.June 2019!!)

- Pre-Engagement process for clarification of relevant requirements (TSI, NNTR…)
- Applications for Placing on market to ERA through **O**ne-**S**top-**S**hop (OSS), incl. definition of Area of Use and submission of all relevant documentation (NoBo, DeBo Cert., AssBo reports …)
- SW platform for submitting files (Applicant)
- ERA will perform the assessment or forward to NSA of Member States (MS), depending on Area of use - but no technical assessment anymore
- Decision for Vehicle **A**uthorization for **P**lacing **o**n the **M**arket (APOM) 4 month after submission of complete documentation
- APOM of modified rolling stock depending on modification: Variant or Version, Example: Typ = VW Golf (APOM)
  - Variant = station wagon, 5 doors, convertible, right/ left-hand drive … (APOM)
  - Version = red, leather seat, 1.8 TDI (no APOM) → self-assessment, normally no NoBo assessment
- **P**lacing **I**n **S**ervice (PIS) performed of the **R**ailway **U**ndertaking (RU) by self assessment of track compatibility (i.e. compare ERATV data of Vehicle with RINF data: e.g. axle load, ATC system, EMC….) and integration of vehicle in a train based on RU SMS
- Vehicle keeper is responsible for registration of vehicle in one MS of Area of Use.

Implementing Acts Vehicle Authorisation (IA VA)

COMMISSION IMPLEMENTING REGULATION (EU) 2018/545

of 4 April 2018

establishing practical arrangements for the railway vehicle authorisation and railway vehicle type authorisation process pursuant to Directive (EU) 2016/797 of the European Parliament and of the Council

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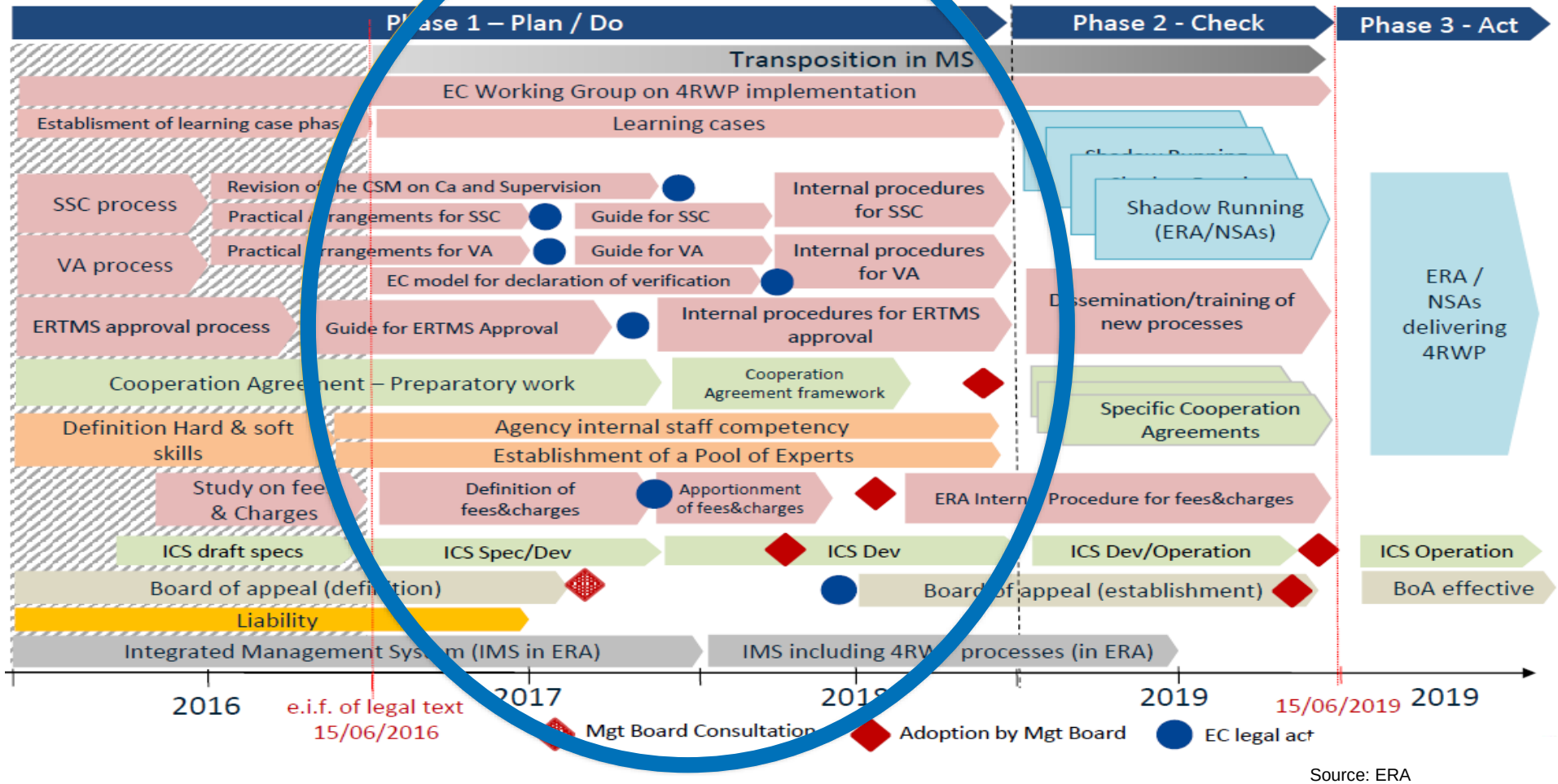
European Rail System – 4th Railway Package

Timetable for the introduction of 4th Railway Package



Source: ERA

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European Rail System – 4th Railway Package

Technically identical locomotives for a potential area of use D-A-CH-I-NL shall be initially registered in two different countries for two different operators:

- 15 locomotives (including locomotive No. 1) are to be provided by the operator and owner GREEN-Cargo operated and registered in Germany

- 5 locomotives owned by the leasing company LCR are intended for the Dutch operator RED-Transpo be registered in the Netherlands

European Rail System – 4th Railway Package

The process according to the current state

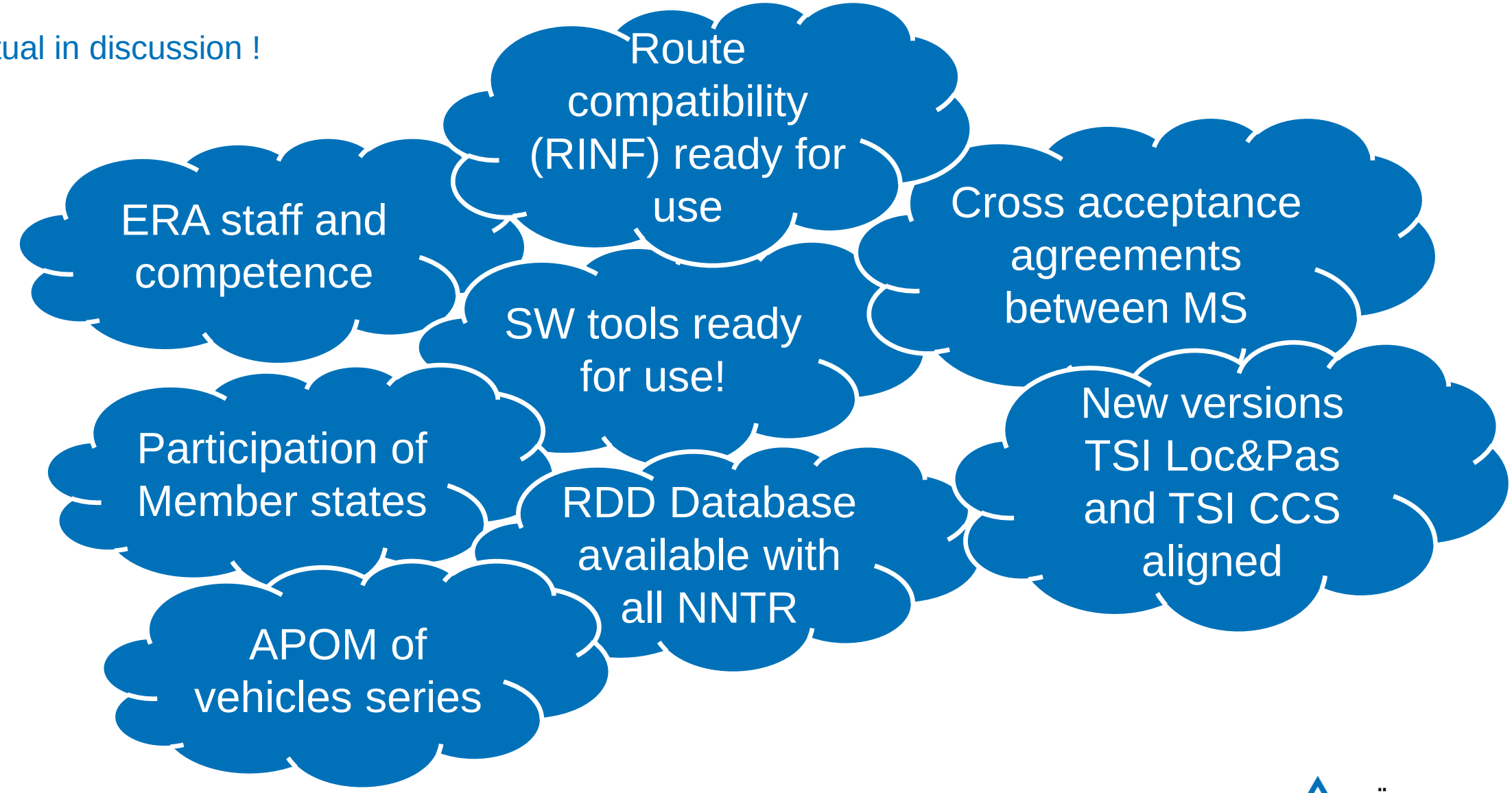
1. The applicant obtains the authorization in one country (DE)
2. After that, he goes, in turn, to the authorities of the other countries
3. Approvals from other countries are partially recognized (or not)
4. Documents are to be created "country-specific" (language!)
5. There is no transnational type concept

The process after the 4th railway package

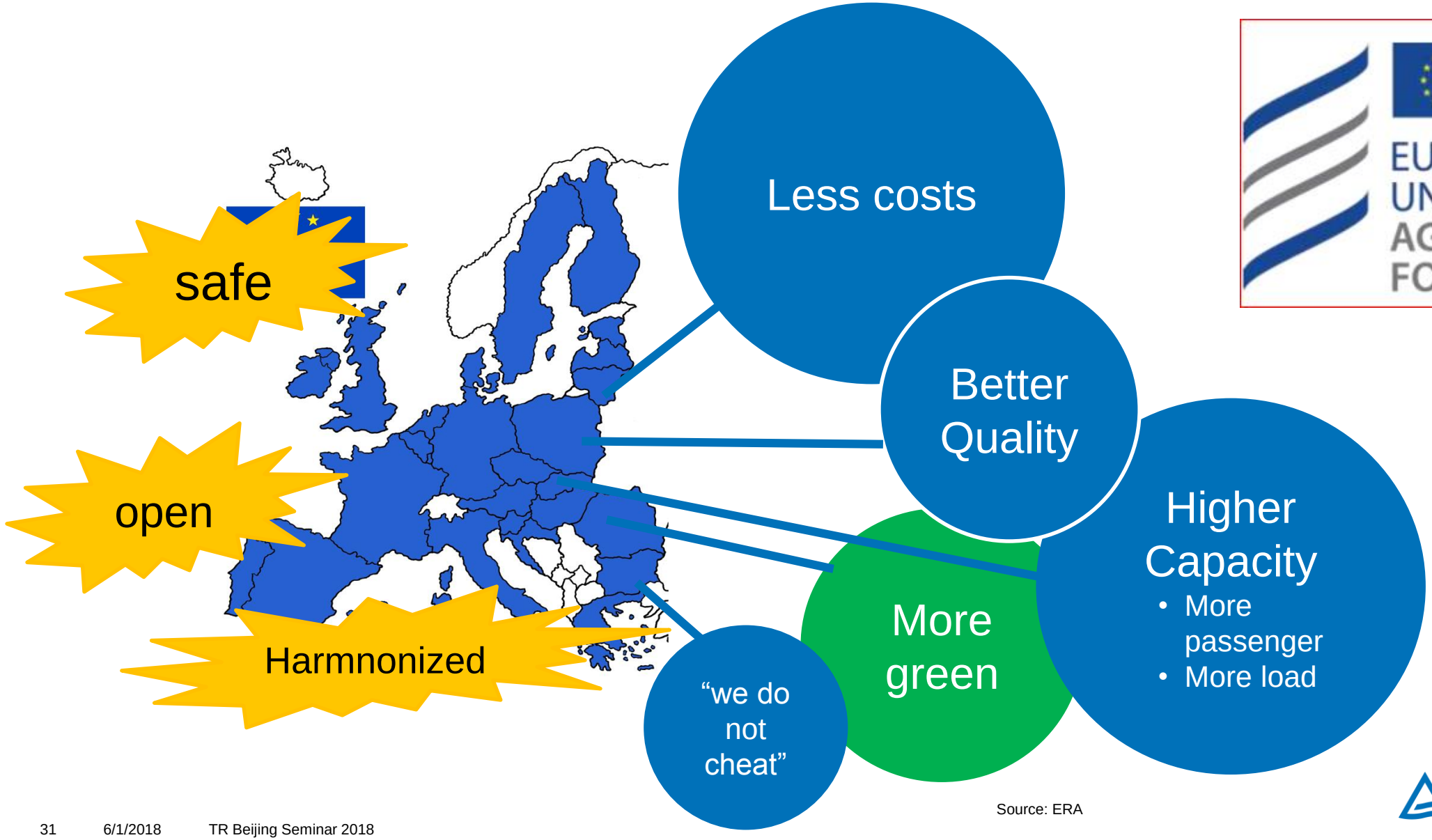
1. The manufacturer decides to apply for the first authorization to the Railway Agency of the European Union (ERA)
2. ERA invites NSA of the affected member states for meetings for first authorisation
3. Test runs are required - Locomotive No. 1 will be used (before its authorisation) to prove that the type D-A-CH-I-NL complies with the TSI and the German national rules
4. ERA subsequently issues authorisation for the type D-A-CH-I-NL for Germany, with contributions of the EBA as the competent national authority for the area of use, at the same time, ERA issues the APOM for locomotive No.1
5. Loc type D-A-CH-I-NL will be registered in European vehicle type register ERATV, the vehicle locomotive No. 1 in the German National Vehicle Register (NVR)
6. For the 5 RED-Transpo locomotives German registration can be used if the manufacturer is the applicant. Only evidence of compliance with any Dutch national rules has to be provided.
7. ERA expands the area of use for the type D-A-CH-I-NL with Netherlands, based on contributions of NSA NL as the competent national authority for the area of use
8. The registration of the 5 vehicles in the Netherlands has to be done by local authority

4th Railway Package – Questions, Challenges!

Actual in discussion !



4th Railway Package - By rail to a sustainable Europe



EUROPEAN UNION AGENCY FOR RAILWAYS

Source: ERA

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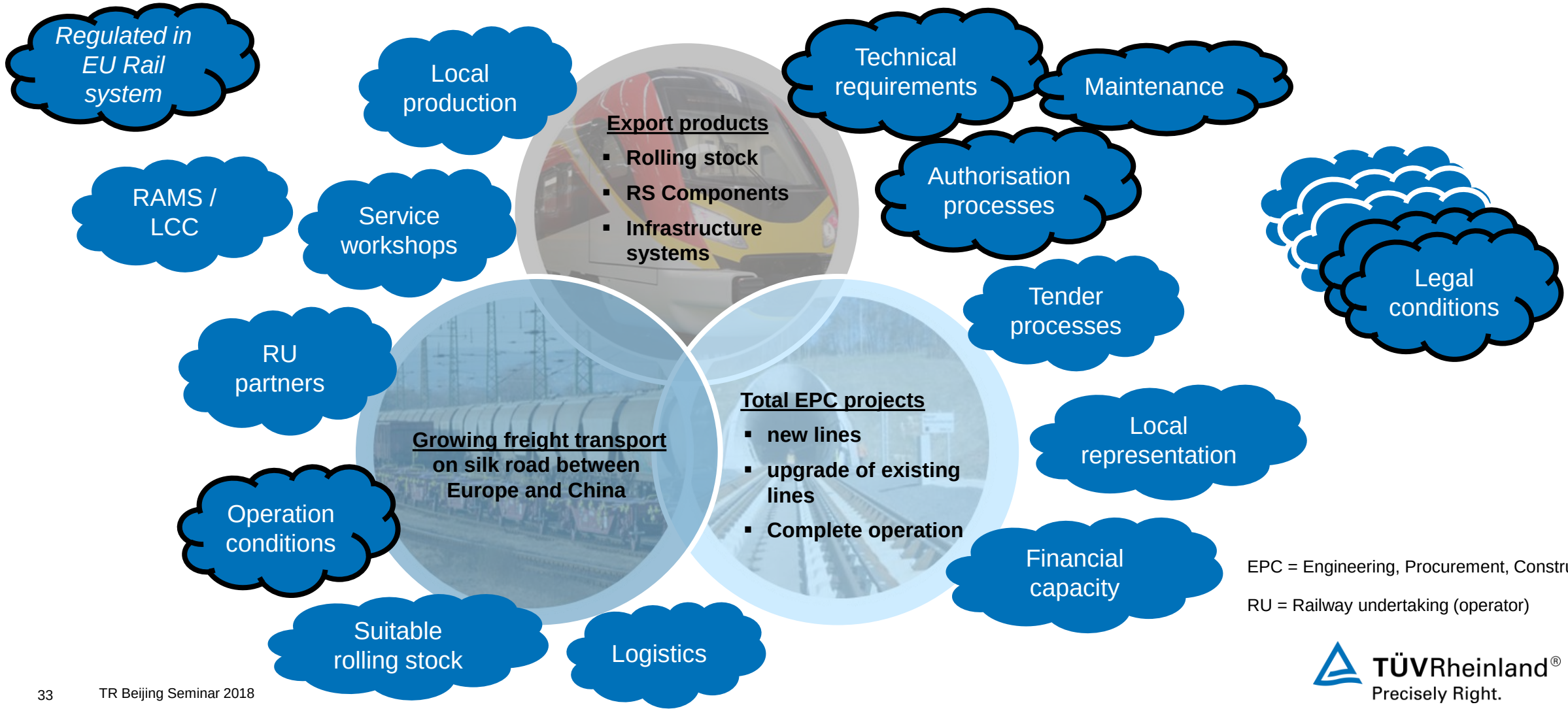
European market access

Beside regulated area:

Further challenges for European market access!



EPC = Engineering, Procurement, Construction

RU = Railway undertaking (operator)

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European market access - General entry barriers / risks

Structured analysis of target markets and clients will draw up entry barriers which need to be considered - examples

Cost	Capital	Know-how	Location	State power
▪ Incumbent advantages (i.e. essential facility network) ▪ Economies of scale	▪ Access to funding (i.e. incumbent advantage in financing fleet) ▪ Support program for locals	▪ Knowledge of national notified technical rules / homologation ▪ Access to relevant contacts	▪ i.e. depot location may be a problem for later entrant	▪ Degree of liberalization of rail markets ▪ Local content required ▪ Know-how transfer compulsory

Mitigation

→ analysis (supply and demand side market, players etc.)

→ Risk management

European market access - Market analysis

Comprehensive market analysis requires insight in supply and demand side market and relevant players

market accessment

- Size and growth prospects
- Demand drivers
- Socio-economics
- Regulation

Competitor Analysis

Market structure

Government protection

Analysis of individual competitors

Customer analysis

Demand market Development of market structure

Analysis of individual customers

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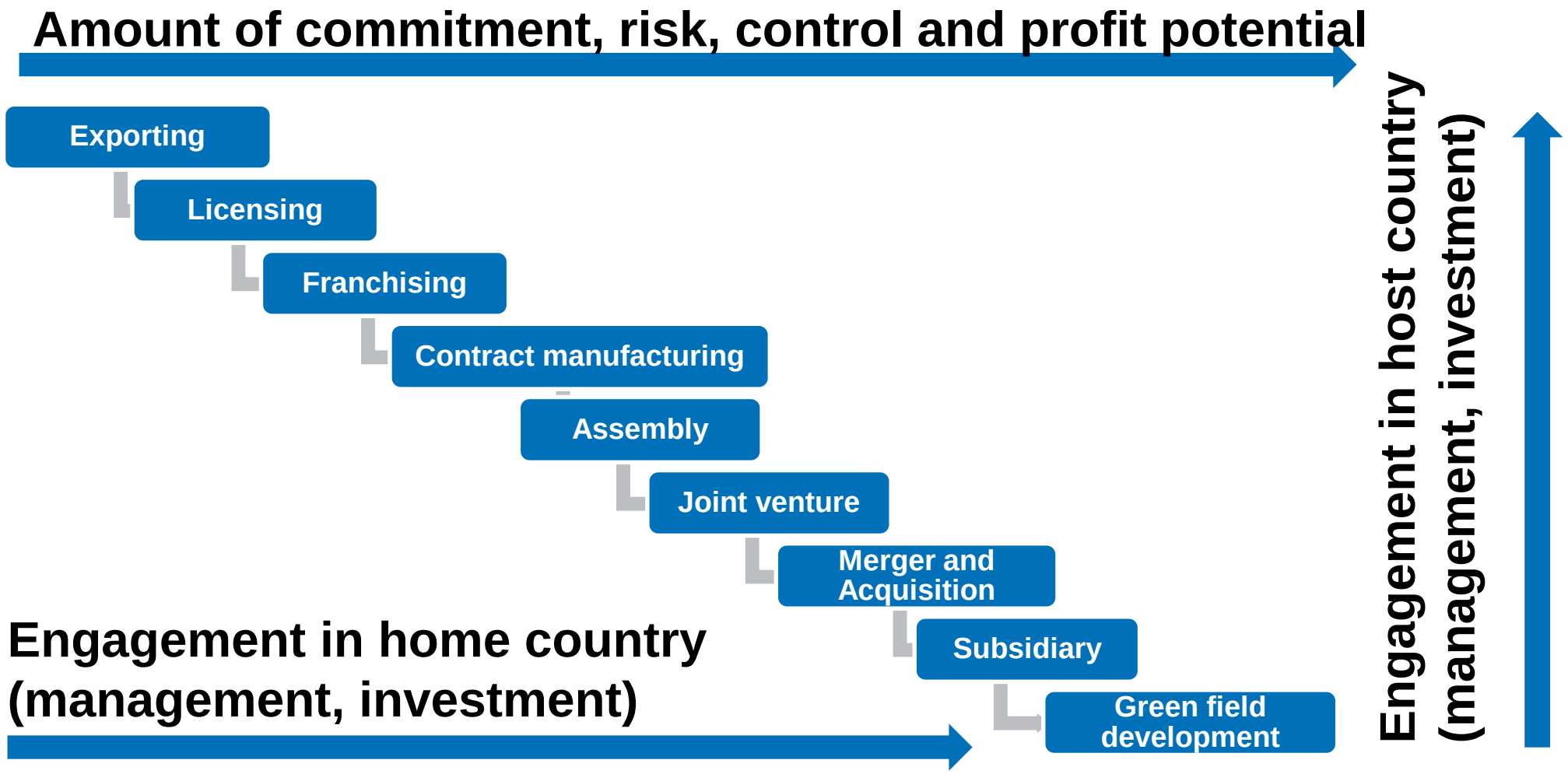
European market access - Types of market entry modes



European market access - Market research, business and product development

- Worldwide network - TÜV Rheinland is able to mobilize colleagues in nearly all countries
- Wide networking to suppliers, operators, authorities
- Helping to enable to build strong and lasting relationships into foreign markets
- Local view and excellent knowledge of local technical requirements and habits

From large scale …

… to detail.

Starting with first market explorations …

Getting started into a new market / a new country

Market survey, market entry supervision,

Observation of developments and current sector

Identifying opportunities in all rail segments from hardware to operations

… up to support the approval of services, components and vehicles.

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European market access – 4th Railway Package

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European market access – TÜV Rheinland as partner

Considerations !

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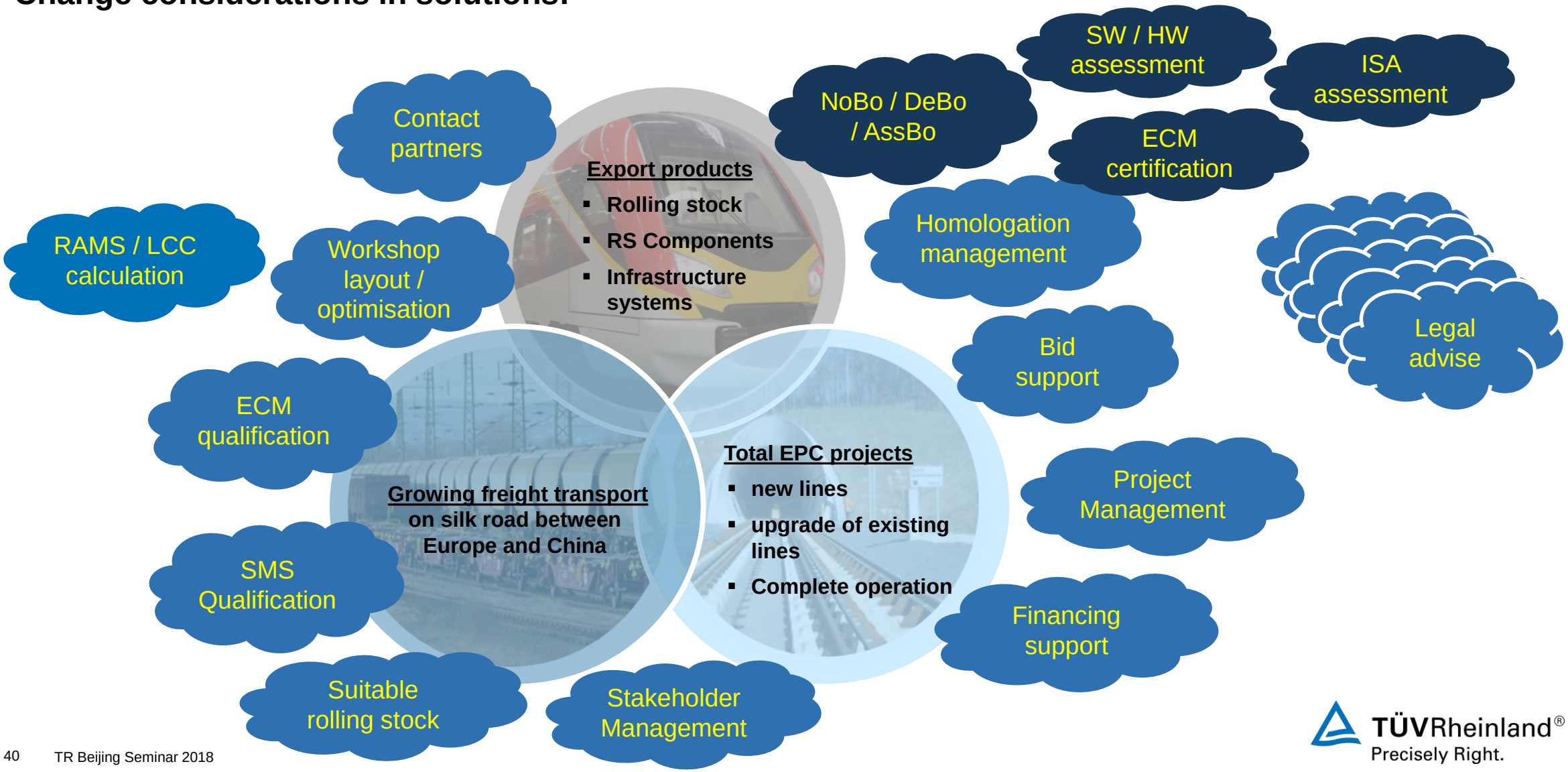
European market access – TÜV Rheinland as partner

Solutions !

Change considerations in solutions!



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TÜV Rheinland, your reliable partner in safeguarding railway systems work better for society

Back-up

Reference Rolling Stock – CAF Railway Passenger Car Renewal

EC-Verification of vehicle according to TSI LOC&PAS and TSI PRM as well as assessment of national technical rules (DeBo) Hungary

Client: MAV-Start, Budapest, Hungary

Project duration: June 2015 - ongoing

Project Manager: Knut Meierjürgen

TSI new

Task, Services and Results

- Project kick-off meeting (Clarification and coordination of assessment process, bases of assessment and scope of validation)
- Assessment of documents (Assessment of technical documentation for renewed components and systems, technical notes to documents)
- Type examination (Inspection of vehicle)
- Monitoring/witnessing of test runs in Hungary
- Preparation of „Technical File“ and EC-Certificates of Verification

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Reference Rolling Stock – X2000 Renewal

EC-Verification regarding to the modification of vehicle according to TSI LOC&PAS, TSI PRM and TSI NOI

Client:	ABB Schweiz AG
Project duration:	August 2014 - ongoing
Project Manager:	Michael Dörner
Project value:	100.000 €
Project location:	Turgi, Switzerland

TSI modification

Task, Services and Results

- Project kick-off meeting (Clarification and coordination of assessment process, bases of assessment and scope of validation)
- Assessment of documents (Assessment of technical documentation for all replaced components/Subsystems, technical notes to documents)
- Type examination (Inspection of a prototype vehicle)
- Assessment of production processes in the context of product testing (module SF)
- Preparation of „Technical File“ and EC-Certificates of Verification

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Total Systems for the European Market

System supplier entry support and bid support

An eastern supplier of EMU has a global strategy based on exports (project bidding) combined with acquisitions and / or green field development of production facilities

Entry strategy / mode

1. Identification of target markets and projects
2. Bidding combined with direct investment after successful bidding
3. Strategically export is an option

Market entry support services

- Identification of the most attractive European target markets for the product range of electric trainsets
- Comparative analysis (macroeconomic, political, industrial and technical drivers as well as degree of liberalization)
- Detailed analysis of identified first best target markets including development of market entry strategies and identification of particular projects
- Bid support and homologation support

LCC for tram procurement 2020 assignment

LCC/RAM oriented quality assurance for a tram procurement

City/Country: Basel, Swiss

Client: Basler Verkehrs-Betriebe BVB

Project duration: 2011 - 8 month

Project management: Christian Trescher

Scope of services / Tasks	Objective
▪ Cost transparency for the field of LCC already at bid appraisal ▪ Reduction of tram vehicle's maintenance costs ▪ Input for maintenance planning ▪ Long-term commitment from the supplier	▪ Clearly arranged and clearly structured LCC/RAM catalogue for bidding documents ▪ Development of verification processes for long-term quality assurance ▪ LCC/RAM analysis of submitted bids

LCC/RAM-Monitoring by developing KPIs in Maintenance

Field data concept and definition of requirements for LCC/RAM

City/Country/Marketplace: Berlin/Germany

Client : Berliner Verkehrsbetriebe

Project Duration: 4 months

Contracting Authority: Management Light Rail, BS-F

Project Management: Markus Krippner

Project deliverables / Tasks	Results
▪ Definition of the requirements for a software tool for the evaluation of operating and maintenance data ▪ Concept definition for field data acquisition based on SAP-PM (state of contract displayed as ‘traffic light’)	▪ Fully automated verification of the guaranteed LCC/RAM-parameters ▪ Minimum possible data maintenance effort (No double data entry in maintenance) ▪ Day-to-day LCC / RAM evaluations

Procurement of light rail vehicles (TW3000)

Supporting the procurement of new light rail vehicles

City/Country: Hannover, Germany

Client: üstra Hannoversche Verkehrsbetriebe AG

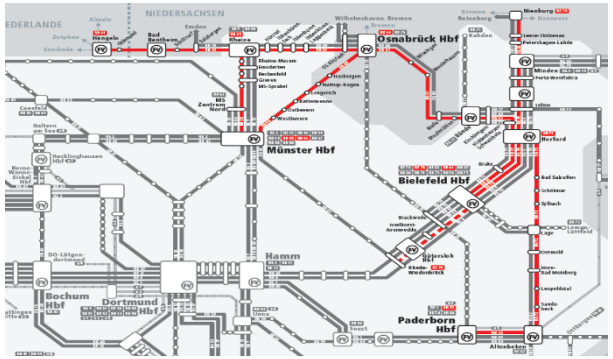
Project duration: 10 months

Project management: Christian Trescher

Scope of services / Tasks	Objective
▪ Cost transparency during the bid appraisal ▪ Long term commitment of suppliers - even after the warranty period ▪ Creation of budget and planning security in the field of maintenance	▪ Workshops for determination of LCC / RAM criteria ▪ Guidelines for preparing a bid ▪ Definition of verification processes ▪ LCC / RAM evaluation of the bids received

Rail – Case Studies

Bid Management and definition of optimized operation and maintenance



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Tasks	Network
▪ Project Management of the overall bid process and vehicle procurement ▪ Bid document quality assurance ▪ Definition of a detailed operation and maintenance program ▪ Appraisal of maintenance effort ▪ Workshop site identification and concept elaboration ▪ Yearly revenue prognosis for gross contract ▪ Vehicle specification and EU-wide tendering	▪ 5.3m km ▪ 27 EMU (used and new) ▪ 12/2017-12/2032

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Rail – Case Studies

Vehicle production supervision Brazil / Korea

Build supervision for

15 metro trainsets for ViaQuatro, Metro Line 4 São Paulo, produced by Rotem in Changwon

Client ViaQuatro Metro São Paulo

Tasks of TÜV Rheinland

Build supervision, first article inspection and acceptance of trains at Changwon rolling stock manufacturing site to guarantee international best practice and highest quality standards

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