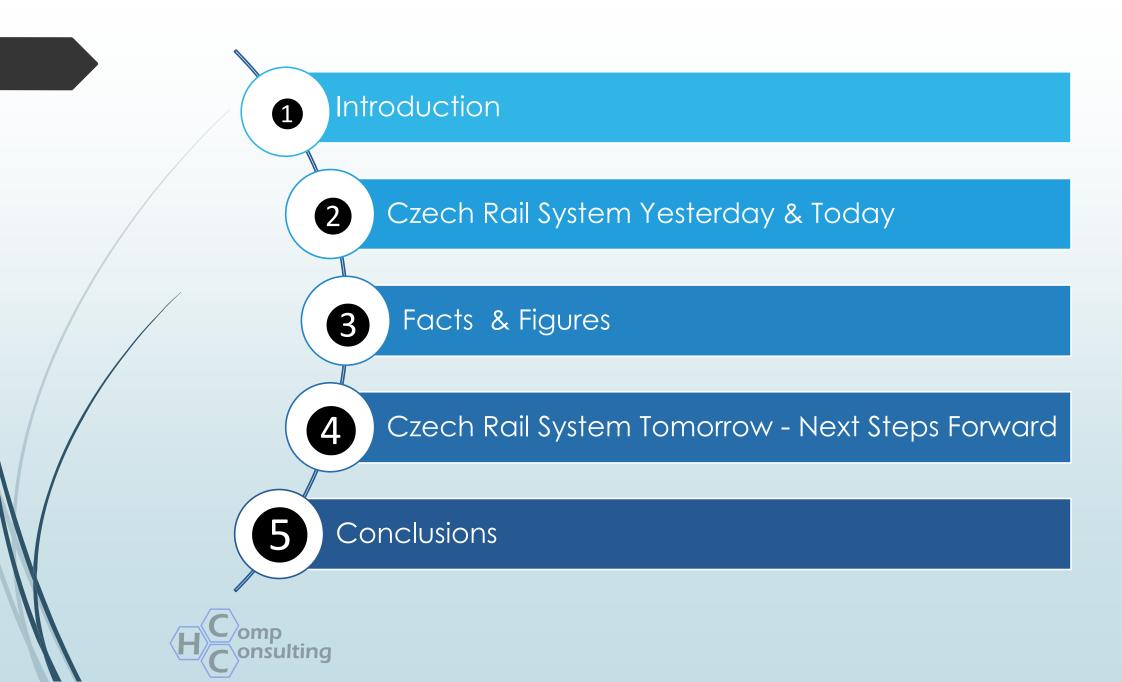


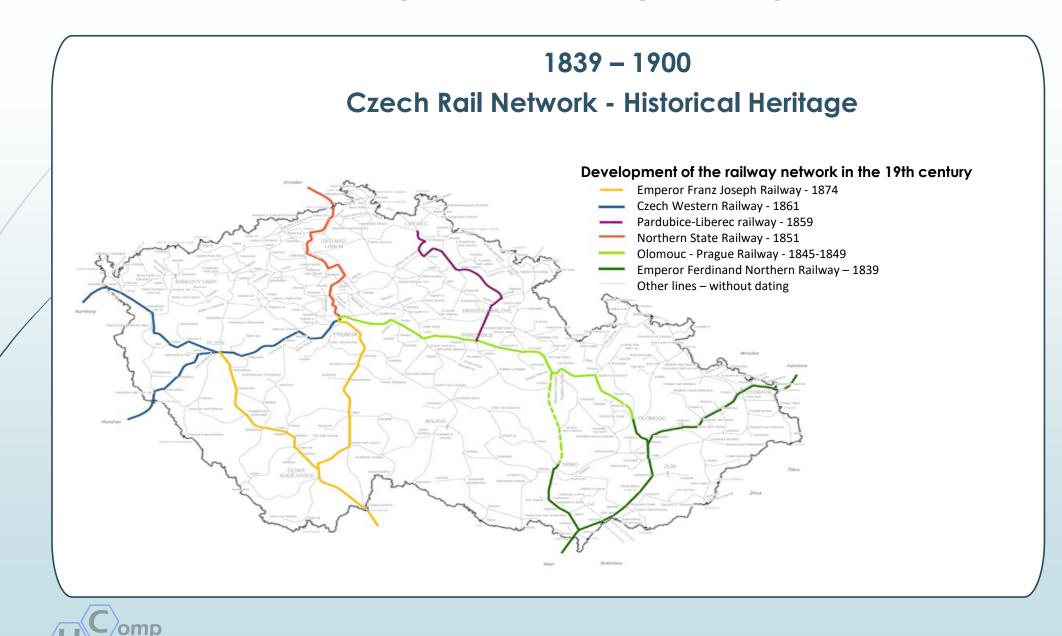
MODERN RAIL SYSTEM IN THE CZECH REPUBLIC – VISION 2050+

INNORAIL 2021 – Budapest, November 15

Miroslav Haltuf – independent Rail Expert

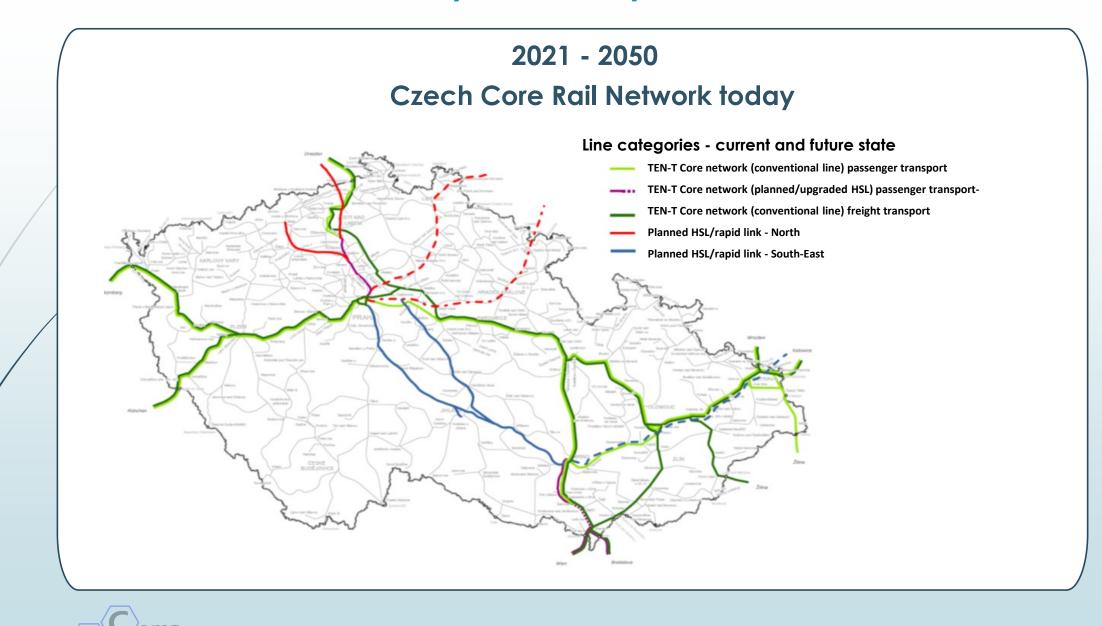


Czech Rail System Yesterday & Today

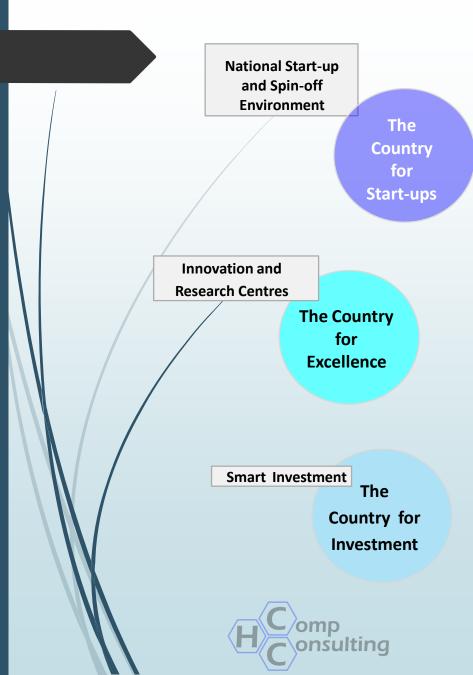


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Czech Rail System Today & 2050+



Czech Rail System – a Part of Czech Innovation Strategy



The Country for R&D Funding and Evaluation of R&D

• Strengthen R&D funding (measured as % of GDP): **2025 2.5%**, **2030 3.0%**, i.e. growth by 0.1 percentage points each year; of which 1% from public resources and from company resources, 1.5% in 2025, and 2% in 2030.



The Country for Technology Polytechnic Education

The Country for Digitalization

Digital State,
Manufacturing
and Services

- Prepare society for trends such as IoT, AI, BigData, new types of human-machine interface, etc.
- Promote implementation of applied research on transformative technologies in practice.

The Country

for

Smart

Infrastructure

Mobility and Construction Environment

Smart Marketing

The Country for Smart People

- Complete the TEN-T core network.
- Build a sufficiently robust network of transport telematics systems in the Czech Republic (at state and regional level) and integrate data from them into the National Transport Information Centre (NDIC)

Intellectual Property
Protection

The Country for Patents

Czech Rail System – Challenges

Railway

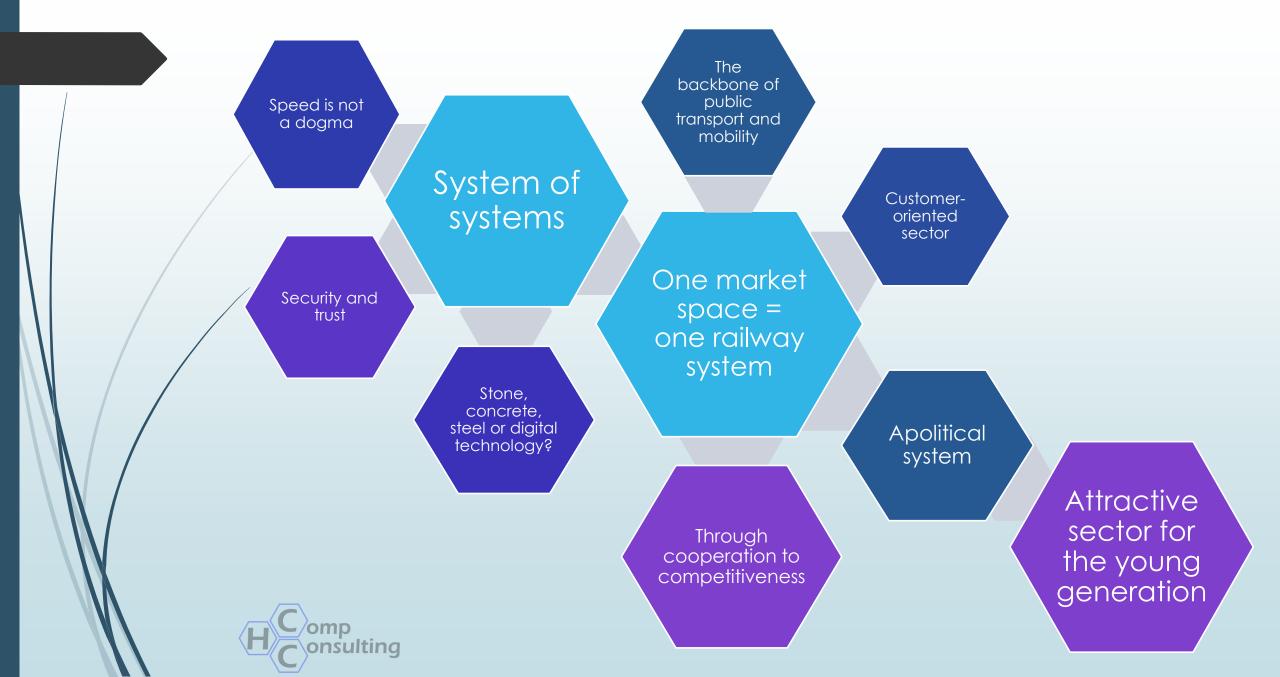
- is the transport mode of the future
- the most convenient, fastest, safe and most ecological
- The development of railways, especially high-speed lines, can fundamentally and positively change the face of our country
- rail mobility prevents rural depopulation, helps trade, reduces traffic density on the motorways and improves the environment

People's perceptions of railways

- are very diverse and different
- It is not necessary to say what the railway looks like
- but it is necessary to say what it should be in the future
- railway transport sets its partial short-, medium- and long-term goals, defines its strategies and visions and tries to reflect development trends in society and in its own field



Czech Rail System – Innovation Perspectives



Czech Rail System – Innovation Perspectives

System of systems

The railway was, is and will remain a package of many diverse systems. Vehicles and infrastructure must be safe, accessible to all users, sufficiently robust and accurate

Rail transport is a sub-sector of transport critical infrastructure. The driver-free train system should also be emphasized; as well as hybrid and battery trains in relation to the carbon footprint issue

One market space = one railway system principles of the Single European Area (4 attributes free movement of persons, goods, capital and services)

Railway must become an intracommunity system, uniform throughout the future Single European Railway Area. The division of rail transport into international and national must disappear Single European Railway Area must be achieved quickly = the Single European Railway Area must be applied by 2030 It means that there will be no monopoly or dominant position of any actor in the railway system. This principle will be meaningfully reflected in the fact that travel and transport of goods will be a very simple process, practically the same everywhere in Europe.

Apolitical system

The railway system must not be dependent on political decisions if it is to function efficiently and correctly

Railway System must be set up in such a way as to achieve continuity in the application of interoperable solutions to all subsystems. so that the railway system is not used as a social policy tool in different ways in individual Member States, but uniform Railway users must be indifferent to who makes political decisions, as the transport of people and goods from point A to point B must be independent of political influences

Customeroriented sector

The railways will have to change their approach to users, passengers and carriers Railway undertakings will have to change their business models, they needs to be more customer oriented In all respects, the customer's wishes must be fulfilled, if possible at all Without customers there is no demand for services, without demand for services there is no use for vehicles, and subsequently for infrastructure.

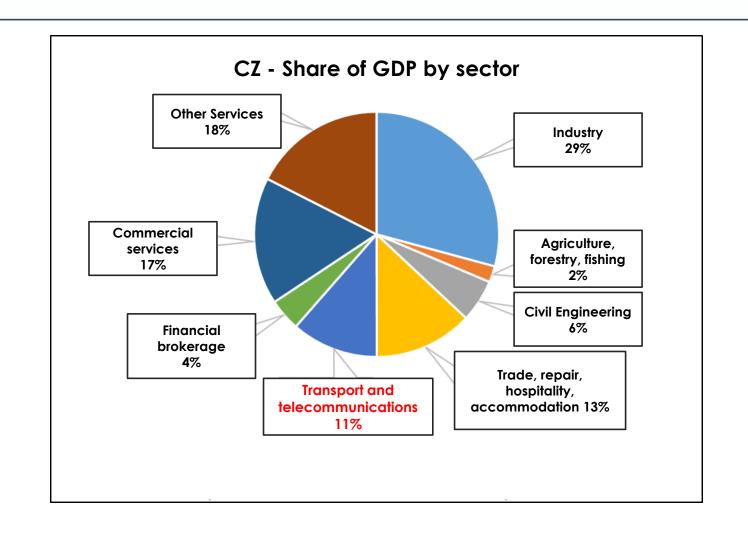
Attractive sector for the young generation

Railways must invest heavily in research and innovation, they must be completely rebuilt into new technologies

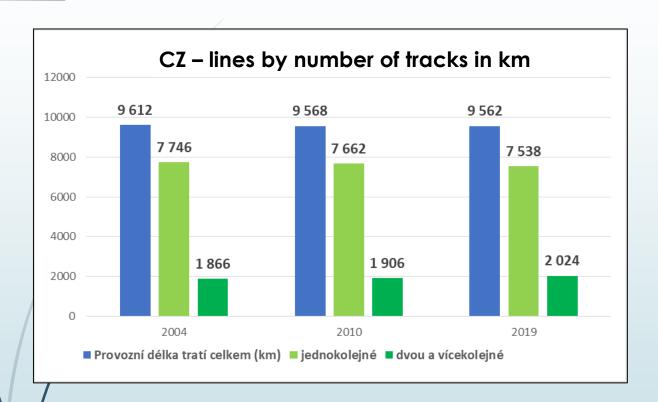
It must become an attractive and dynamic field that will allow future generations to try to carry out all their plans - even those that may be too visionary Only in this way will it be possible to achieve that the railway is perceived as a modern and progressive mode

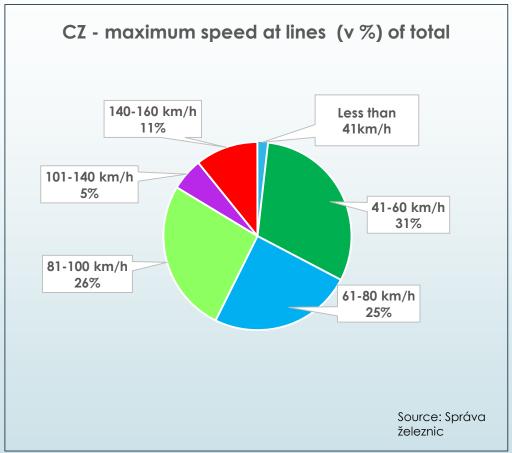
This will create an open, modern, technologically advanced system that will be able to survive for at least another 200 years



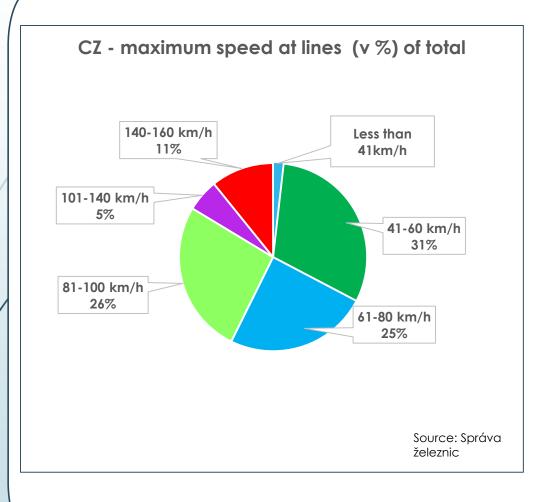


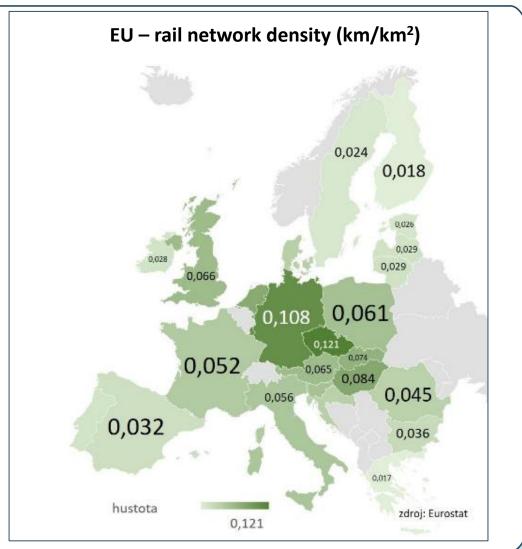




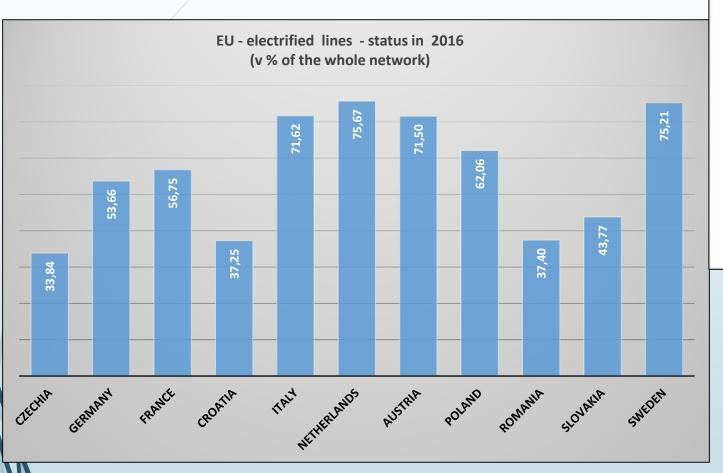


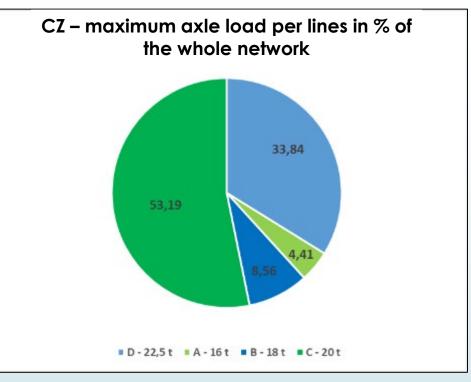




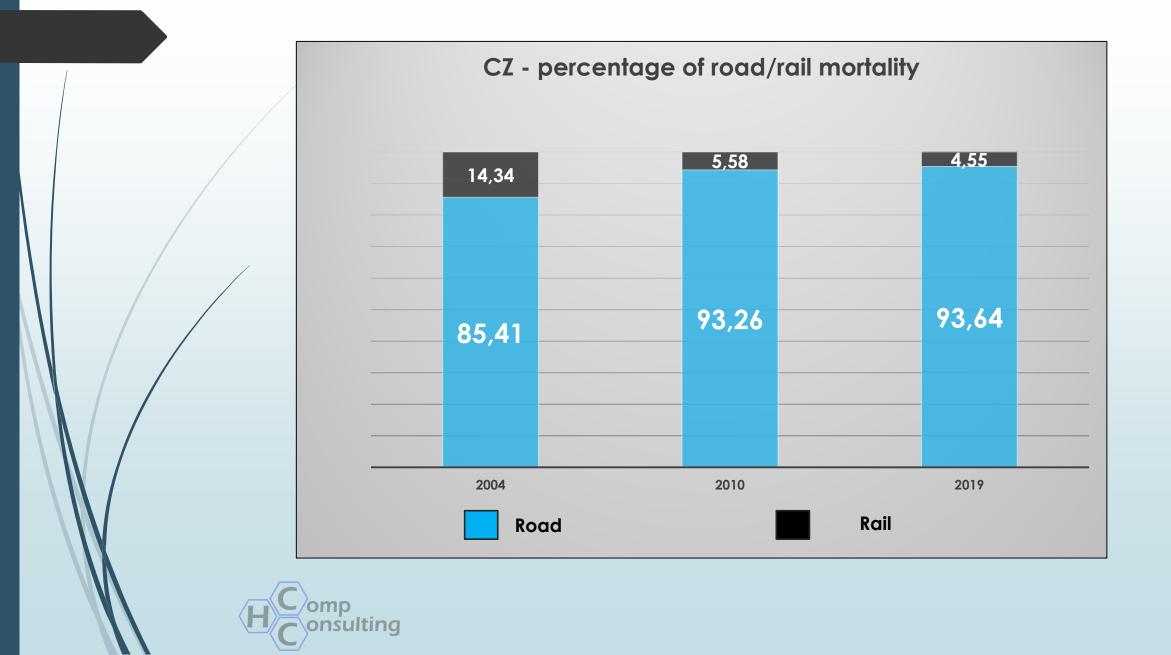








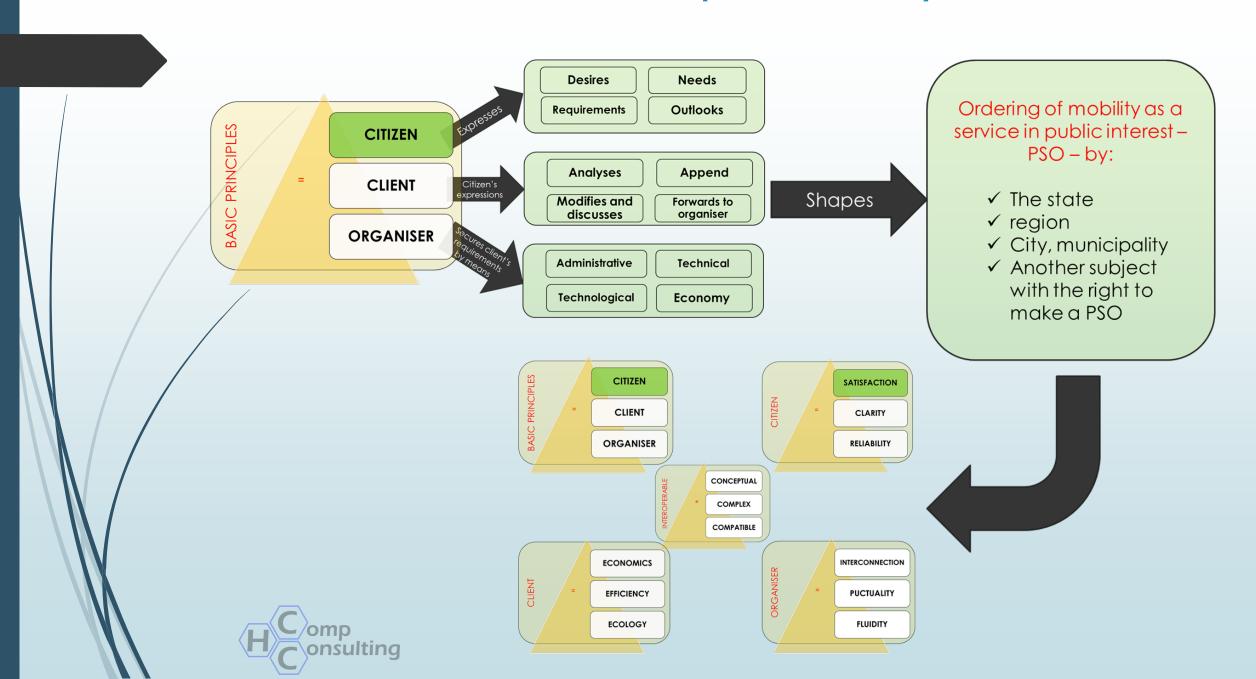




Czech Rail Sector in a Nutshell

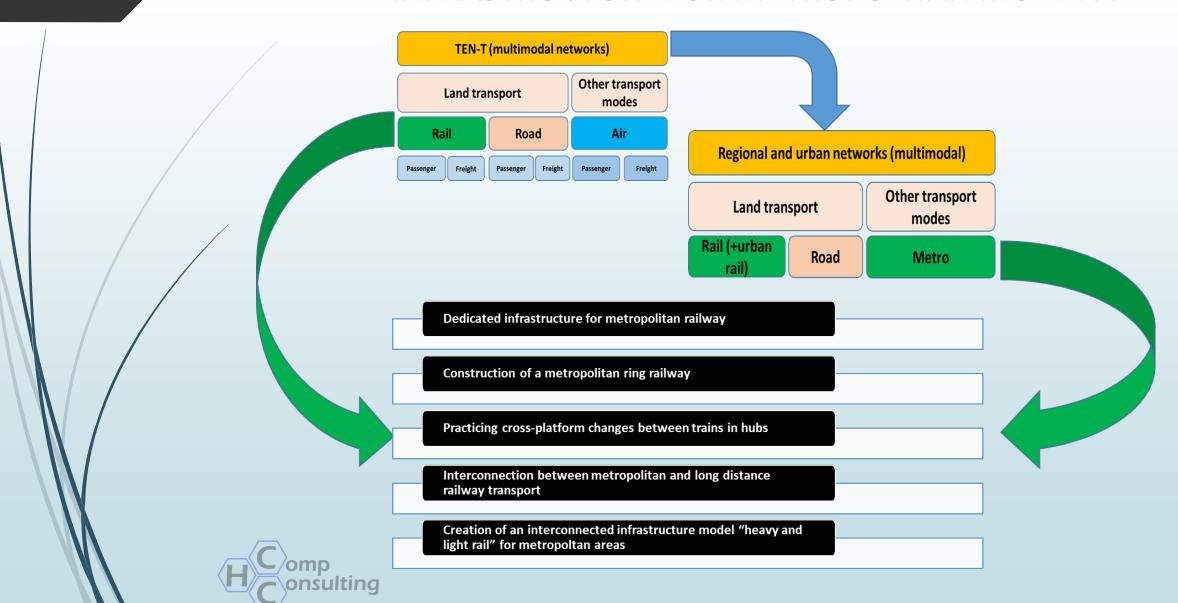
UNIVERSITIES AND ROLLING STOCK CCS **TELEKOMUNICATIONS** RESEARCH **Manufacturing** Manufacturing Components Components Networks Services **CENTERS** and maintenance of complete **AŽD Praha ČD Telematika ČD Telematika** 1. Škoda Electric 1. Starmon Univerzita Pardubice rolling stock O2 ČR 2. ČD IS (smaller rail CCS, 2. (traction (complex DFJP T-Mobile CŘ Wayside monitoring 3. equipments) manufacturi ČVUT Praha – FD 2. AMIT (on board **VODAFONE ČR** ng of rail systems) 1. Škoda VUT Brno TTC Marconi units) CCS, ERTMS Masarykova Univerzita Transportation 3. BORCAD (seats, 2. implementat T - CZ ČD DPOV Brno 3. RETIA interiors) ion) Západočeská univerzita v (complex 4. GHH-Plzni maintenance) **BONATRANS** Výzkumný ústav (wheelsets, IT AND TELEMATICS železniční - VÚŽ (NoBo, boogies) rail test cirquit) **INFRASTRUCTURE** 5. IG Watteeuw ČR Výzkumný ústav SW, applications Services (gears) kolejových vozidel – 6. DAKOCZ Construction Components VÚKV **OLTIS Group ČD Telematika** (braking systems) Centrum dopravního projecting 2. ČD IS INTENS (dopravní výzkumu, v.v.i. telematika. Třinecké 1. SUDOP kooperativní ITS) Elektrizace 2. železárny (rails 3. SPEL železnic and SÉCHERON Praha a.s. components) TCHEQUIE, SPOL. 3. Subterra a.s. 2. DT-S R.O. (telemetrie výhybkárna a a tachymetrie) strojírna **USERS LEVEL Systems** ŽPSV s.r.o. 3. **OTHER** (components Passenger RUs Freight RUs Infrastructure for substraction Manager manufacturer) **Integrated Transport** Multimodal/Intermodal ČD, a.s. Správa Transport ČD Cargo, a.s. 2. REGIOJET **PKP Cargo** železnic, s. o. ROPID Bohemiakombi 3. **LEO Express** International 2. **KORDIS** 2. **METRANS ARRIVA Vlaky METRANS Regional Public** + other smaller RUs Sdružení Transport ŽESNAD Intergrators -+ other cca 120 RUs **ČAOVD** (others)

Czech Rail Metropolitan Mobility

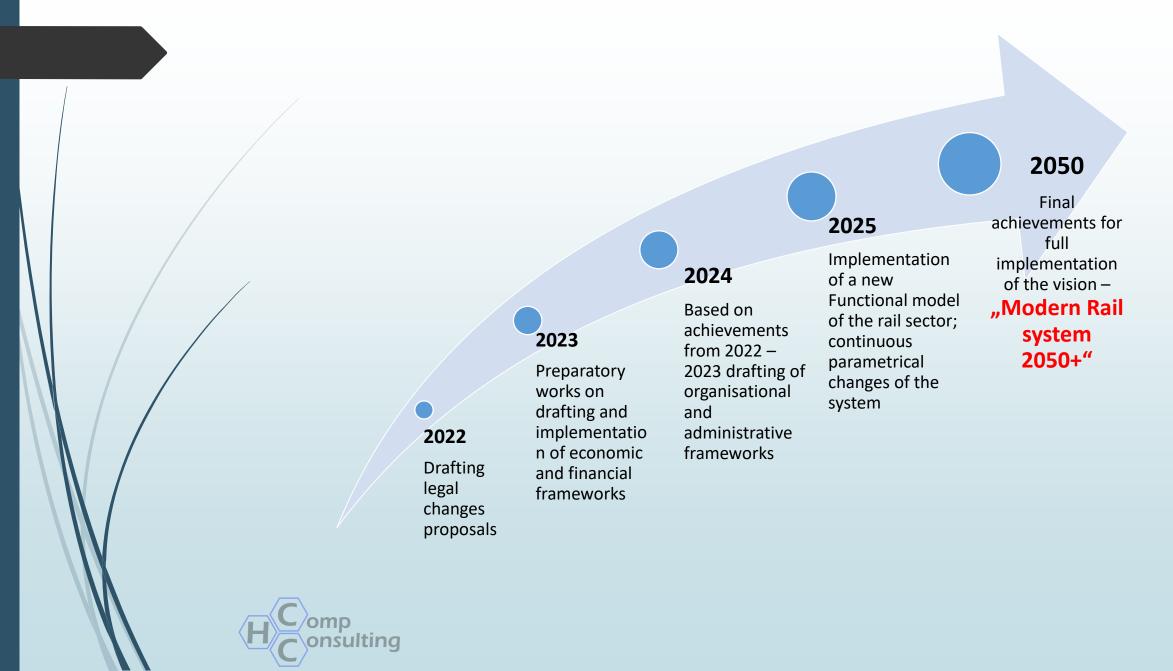


Czech Rail Metropolitan Mobility

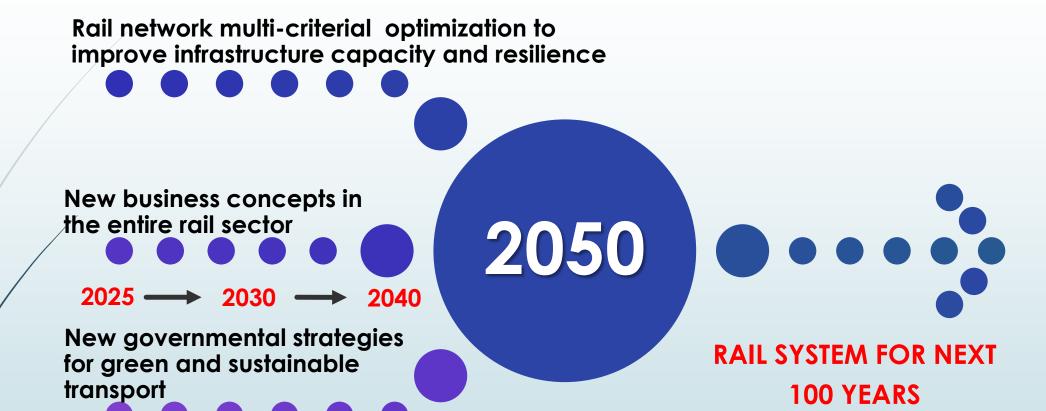
INFRASTRUCTURE FOR METROPOLITAN MOBILITY



Czech Rail System Tomorrow - Next Steps Forward



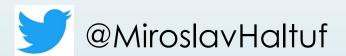
CONCLUSIONS







THANK YOU FOR YOUR ATTENTION!



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