Deliverable 7.3
Executive Summary

Local transportation and the role of rail

1. Executive Summary

The vision components of SPIDER PLUS

The main objective of the SPIDER PLUS work package (WP) 7 was to develop and elaborate a SPIDER PLUS 2050 VISION for a rail based European society and to assess and roughly verify the feasibility and achievability of the vision.

The visioning has been carried out in five different components, comprising the five tasks of the WP 7. For each vision component a separate deliverable was produced (Figure 1).
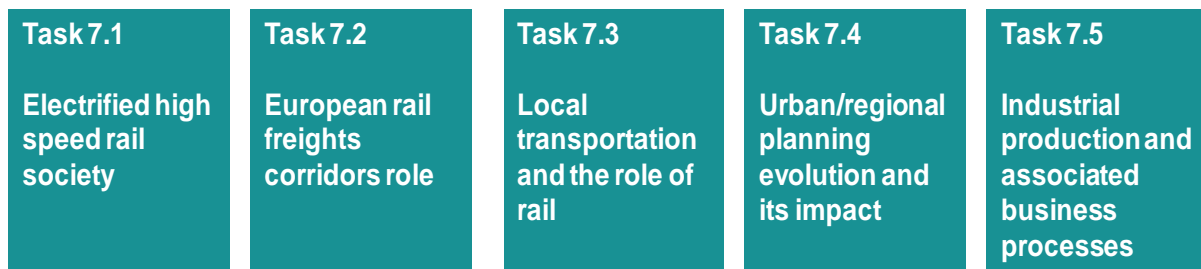
Task 7.1	Task 7.2	Task 7.3	Task 7.4	Task 7.5
Electrified high speed rail society	European rail freights corridors role	Local transportation and the role of rail	Urban/regional planning evolution and its impact	Industrial production and associated business processes

Figure 1: Tasks in SPIDER PLUS WP7

The work in WP 7 makes use of the results of the work packages As-Is Situation (WP5) and MEGA TRENDS (WP6). The necessary measures and impacts of the vision elements are assessed in WP8, while concrete actions to be taken are derived in WP9. In WP7 the main focus is on drafting and describing the SPIDER PLUS vision components and the preferred future 2050 from the perspective of the five tasks.

The vision for 2050 has been described from different perspectives but remaining in a coherent structure and providing a comprehensive picture of the preferred future of a society overwhelmingly served by rail.

The vision targets & development

It is important to note that the vision for 2050 cannot simply be described by observing past developments and current drivers of change. In the past progress commonly came from revolutions instead of evolutionary and predictable developments. Greater structural changes provoked new solutions and services. Revolutionary ideas are driven by imagination and belief in innovative solutions, not by considering the past. The 2050 future cannot be based only upon following trends. Instead it needs to be inspired by the urgent needs, the anticipated deficiencies and the greater framework that requires future changes. Thinking about 40 years into the future enables revolutionary changes in some areas (e.g. technological solutions, communication) but also limits possible developments in others (e.g. infrastructure construction, rolling stock).

The first step in the vision development was the specification of targets for a preferred future. The primary target of the 2050 vision is a society overwhelmingly served by rail. This implies that we need to describe a European society where the rail market share is greater than 50%. This value can be interpreted as an average across all relevant market segments. Thus not every segment has to accomplish a 50% market share (for some this might be out of reach, even with vast improvements) but i.e. over the entire passenger and freight transport market (consisting of long and short range, commuter traffic, high speed etc.) this value should be reached. Important input for specifying the targets came also form the white paper (European Commission 2011).

The target specification was done primarily from the demand perspective, considering the modal share. The offer side has to supply sufficient capacities, advanced technologies and comprehensive framework conditions.

The vision for the local area – Task 7.3

The vision for local transportation and the role of rail in 2050 presents a picture of the future local area, stretching from the city centre, to the peripheral urban areas, to the suburbs to the outer agglomeration zones. This report includes the perspective of freight and passenger transport separately. For both perspectives vision targets have been derived based on the EC White Paper vision (European Commission 2011), the passenger transport vision for long distance rail (Task 7.1) and the freight transport vision for the corridors (Task 7.2). The vision targets are defined for three market segments: city area, regional area and the interface to medium and long distance transport.

For freight transport the role of enabling a seamless connection of urban freight transport with long distance rail network and integrated city logistics is the key targets. Regarding city logistics and last mile distribution there is also in the future only limited potential for rail based transport. The target there is a CO_2-free urban freight logistics. For the regional and medium distance area a share of rail and rail based underground transport systems of more than 25% is targeted. For long distance rail freight a market share of more than 50% is adopted from the Task 7.2.

Urban passenger transport should be overwhelmingly served by efficient modes, excluding motorised personal transport; also enabling seamless integration into long and medium-distance passenger mobility. The focus in the urban areas is on substituting all individual car traffic (to below 10%) with efficient transport modes. For the suburban areas as well as for the long-distance transport interfacing with local transport a 50% market share of rail is the vision target (derived from Task 7.1).

The following two vision statements summarise the vision picture enabling the target sets for local freight and passenger transport and the role of rail in 2050. The vision pictures are further detailed in 36 described vision elements in the main body of this report.

Vision 2050 for local freight transport

Long and medium distance multi- and intermodal rail freight services are fully integrated with urban freight logistics services. The shipments are transported and transhipped efficient and seamless from door to door. All freight intensive facilities have a rail access. Additional logistics hubs are served by rail and provide city logistics functions. The bundling in logistics hubs allows the necessary volumes to choose rail as competitive alternative against road freight transport.

Rail freight bypasses avoid congested rail links. The capacity and priority conflicts between passenger and rail freight in conurbations are solved. New operational concepts based on automated rail and automated transhipment/loading and unloading are implemented to serve rail freight nodes. These allow efficient connection of private and public sidings and an efficient transfer between rail and mainly road.

Automated underground freight transport systems, cargo tram and cargo metro can complement rail services in urban areas where the conditions and framework conditions match the system requirements. Cooperation between railway undertakings and logistics/transport service providers are providing combined rail/last mile services. This is fact for multi- and intermodal transport.

Private cooperation for consolidation in city hubs and joint deliveries for urban areas are in place using rail serving the nodes and private sidings with high freight volumes. ICT and IT systems for planning, execution, monitoring and controlling of multi- and intermodal transport chains are implemented with standardized interfaces. They support efficient information and communication processing and a seamless and integrated transport.

Planning instruments and regulations (transport/land use) are in favour of rail. The necessary land for logistics facilities and rail tracks is secured in land use plans. In the local transport plans freight is not neglected anymore and considered as important as passenger transport. Freight intensive facilities need to have a rail access as far as technical feasible and economic viable.

Impacts and feasibility of the vision for local freight

Funding is an overall a critical part of the rail based local freight transport vision 2050. Especially the rail infrastructure for the rail access of nodes, bypasses and new underground freight transport systems and cargo trams/metros are depending on public money. The economic viability of underground freight transport systems is critical and uncertain. The infrastructural investments are of greatest importance in granting the capacity of the network. All these elements are associated with high costs. Because cities are partly depending on national or European funding for the extension of their transport networks regions will be competing for financial support. Also the investments in IT and ICT (Incl. ETC and ERTMS) may be a critical factor for the financial feasibility.

A major part of the vision elements seems to be political feasible. There are a limited number of critical elements as rail capacity management in favour of freight transport, modal split requirements for freight intensive facilities and securing land for logistics activities where it will be difficult to get a political majority. There are very strong interests involved when it comes to priorities between passenger and freight transport and changes in regulation as well as land use planning. Other infrastructure elements and technology elements are less critical. Nevertheless a strong political will is needed on European, national, regional and local level to realise the vision.

The technical feasibility is not a critical barrier to the vision of 2050. Most solutions are derived from existing solutions or solutions under development (e.g. rail freight access infrastructure, cooperation, regulation and planning. Only for a limited number of elements the technical feasibility is not completely certain yet. This concerns the underground freight transport systems, cargo trams and metros, the integration of multimodal with last mile services and the European wide implementation of automation and ICT systems. For these elements further research and development is required to be fully able to assess the final technical feasibility.

Vision 2050 for local passenger transport

The local passenger transportation did not take a uniform development across all cities within Europe. The heterogeneity of cities was preserved. Cities developed according to their size, the number of centres, historical preconditions and cultural backgrounds. The individual structures determined the right development of infrastructure and the adequate integration into the national and international transport networks.

Urban transportation has been constantly improved along the high demand axes with high capacity and high frequency mobility modes. Metro and tram networks were extended to accommodate the main passenger streams. Public transport benefits from priority on all infrastructures. Individual car traffic is reduced to a minimum. The inner city commute by car does not exist anymore. The car trips within the city are for service functions, freight or delivery transports and car sharing trips only. The only exceptions to this rule are people handicapped in their personal mobility who gain access for specified purpose trips. New flexible vehicle concepts replace individual mobility: autonomous shuttles replaced individual car and taxi use. Shuttles can be ordered and will automatically adjust routing and connect with public transport interchanges.

The reduction in individual road transport vastly freed up space for public transportation. The twofold effect of almost prevented car traffic and efficient, dense public transport network reduced the modal share of car traffic below 10% across Europe. Some cities with a slower path of development still rely on personal transportation even within city centres but the small share of these cities does not influence the low overall share.

The main mobility modes metro and tram are complemented with fully integrated service offers (bus network, e-bike, shuttles, e-car sharing) to allow complete mobility chains and true door-to-door trips. To enable the full accessibility of the city every urban inhabitant has access (walking distance) to a public transport station allowing transit with minimal interchange requirements to the full city network. Interchanges are performed centrally in local mobility hubs which integrate high speed (HS) services with the local network. Their built environment is centred on the rail connection and allows quick interchanges between all city modes. The number of mobility hubs per city depends on the urban structure. Multi-centre cities with more than 1 million inhabitants are relying on multiple hubs to prevent long travel times, accommodate the high passenger streams and to connect efficiently to the HS and local rail network. High capacity regional rail feeds the urban system. Access to the cities, parking regulation and road capacities prevent the car as an efficient mode for daily commutes or travel chains for intercity journeys.

Access, payment and navigation in public transportation happens seam- and contactless and is supported through augmented reality. This benefits from a fully integrated transport tariff extended to long distance transport services. The ever increasing costs for mobility with the improved offer required additional funds. The regulatory framework enabled participation of a multitude of public but also private actors in the financing of infrastructures and services. The major share is funded from public sources but private actors are more and more included to offset the induced mobility. Enterprises have to secure their employees' commutes and leisure, shopping and event facilities have to enable public transport access in planning and funding.

Impacts and feasibility of the vision for local passenger transport

Funding is overall the most critical part of the vision for 2050. The infrastructural investments are of utmost importance in granting the capacity of the network, but these elements are associated with high costs.

Because cities are partly depending on national or European funding for the extension of their transport networks regions will be competing for financial support. This requires clear rules and analysis of envisioned projects. Transparent cost-benefit analyses with comprehensive criteria are necessary.

The regulation of the transport sector is the field where public authorities have the most influence on the development of the market. Public opinion can change over time with elections and thus prove as the least progressive factor impacting the feasibility of the vision. The presented elements on regulation can have strong support among politicians and the broad public. Barring access for private cars in city centres benefits society but requires adaption of personal behaviour. Modal split requirements can be interpreted as direct influence on the demand, associated investments can make policies quickly unfavourable. While the overall extended network services will be highly regarded allocating public funding is difficult. New sourcing options are required. Integrating further interest groups is important but difficult. Transparent cost and revenue sharing is necessary to support the implementation. Especially with regulatory actions it can be important to have best practice cases under similar circumstances to refer to.

The technical feasibility is not a critical barrier to the presented vision of 2050. Most solutions are derived from existing solutions or solutions under development. The smart ticketing can be seen as an element which will be integrated universally in the near future but with a lower penetration as discussed in this report. The integration of data can be seen as hindering the full cross region and cross border functionality. Concerns about data use and security can limit the exploitation of potential.

Expanding main rail stations into mobility hubs is challenged by the limited options to re-route existing infrastructure to allow efficient interchanges in one location. While new services can be centred at the hubs, the challenge is to connect existing lines to one or more mobility hubs. With denser cities and limited space available construction works in the core of the central cities face technical limitations.