

LONG-DISTANCE FREIGHT

ROADMAP SUMMARY



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ROADMAP SUMMARY towards goal 3 of the White Paper on Transport:
»30% of road freight over 300 km should shift to other modes such as rail
or waterborne transport by 2030, and more than 50% by 2050, facilitated
by efficient and green freight corridors. To meet this goal will also require
appropriate infrastructure to be developed.«

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1 The EU White Paper goal on long-distance freight in a nutshell

30% of road freight over 300 km should shift to other modes such as rail or waterborne transport by 2030, and more than 50% by 2050, facilitated by efficient and green freight corridors. To meet this goal will also require appropriate infrastructure to be developed.

The White Paper states that freight shipments over short and medium distances (below some 300 km) will mostly remain on trucks. For the longer distances, options for road decarbonisation are more limited and efficient options for freight multimodality are needed. With its particular focus on the facilitation through “efficient and green freight corridors”, the goal emphasises the importance of coordination, of bundling activities and packaging policies in these corridors.

Furthermore, the goal clearly addresses the relationship between trucking on the one side and rail freight and waterborne transport on the other side. It implicitly aims at increasing the relative competitiveness of the latter.

The overall objective of the TRANSFORuM roadmap on long-distance freight is to analyse “Who needs to do what by when?” to achieve the White Paper goal, which milestones are suitable to track progress in the field and which recommendations for European transport policies can be drawn from the findings.

2 Mapping of the long-distance freight field and outlook

The focus of the White Paper goal is the segment of road freight covering distances above 300 km. This segment constitutes 11% of tonnes lifted and 56% tonne kilometres (tkm) within road freight.

A projection that was developed in the “EU Energy, Transport and Greenhouse Gas (GHG) Emissions Trends to 2050 Reference Scenario 2013” (EC, 2013a)

shows an increase in the total freight transport activity by about 57% (1.1% p.a.) between 2010 and 2050. Road freight is projected to grow by 55% during the same period while rail freight is projected to grow by 79% and inland waterway (IWW) freight by 41%.

This means that road freight is projected to amount to 2721 billion tkm in 2050. If we assume that 56% of this volume still consists of freight on distances over 300 km, then 760 billion tkm need to be shifted from road to rail and waterborne until 2050, according to the goal. In addition the reference scenario assumes increases of 300 billion tkm for rail freight and of 60 billion tkm for IWW shipping. If road freight shifted to rail and waterborne according to current market shares (only including container and Ro-Ro transport for maritime), this would imply nearly a tripling of transport volumes by these modes between 2010 and 2050, as can be seen in Figure 1. Although the split between rail and waterborne may differ from this calculation in the different scenarios, the Figure shows the magnitude of the required changes.

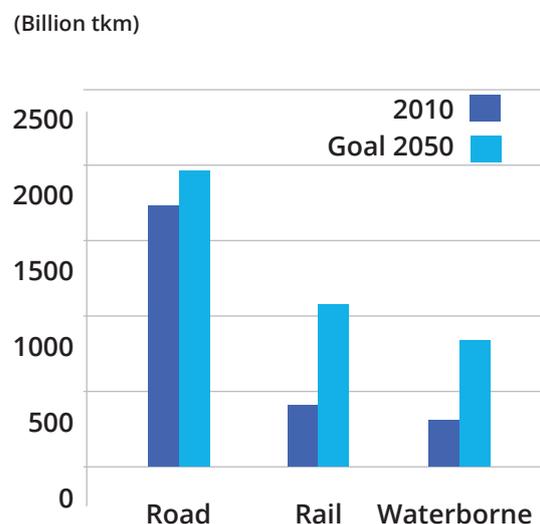


Figure 1: Indicative modal shares in 2050 if the goal is to be reached

In the longer version of this roadmap a brief mapping of the freight sector is provided together with an overview on selected key trends influencing long-distance freight markets.

3 The building blocks of the long-distance freight roadmap

Key elements that required consideration in building the freight roadmap can be related to the following three basic strategies:

- Make rail freight more competitive by improving service quality, lowering costs and increasing transport capacity;
- Make waterborne freight more competitive by improving service quality, lowering costs and increasing transport capacity;
- Realise a level playing field. Make road freight (and all other modes) pay fully for its external costs. Enforce existing rules for road freight regarding cargo weight, speed limits and working conditions, for example.

The stakeholder consultations carried out in the project actually highlighted that a combination of different approaches is needed to achieve significant modal shift. However, for reasons of clarity in this section we introduce three key areas separately. We will explicitly deal with their combinations later in the following sections.

3.1 Rail freight

The most important factors for customers are that transport fulfils some basic quality requirements and that the cost is acceptable. Customers will not pay much of a premium for environmentally-friendly transport. It is therefore important that all modes pay for external effects like emissions or noise. To get more customers to choose rail the following measures are essential:

- Deregulation of freight railways, in combination with other measures, to improve service and cut costs;
- Establishment of rail freight corridors to improve service in international transport;
- Better maintenance of tracks and operation planning for freight;
- More efficient intermodal transport systems, not least regarding hubs;
- Information systems about available supply of rail transport;

- Information systems for tracking and tracing consignments (KTH Railway Group, 2013).

In many forecasts, freight demand in Europe is projected to increase by around 60% until 2050. With business as usual, road will maintain or increase its modal share. With a mode shift scenario, rail may increase its market share from 18% to 36%, meaning that there will be more than three times more rail freight than today. There are several measures to increase rail capacity; longer and heavier freight trains; faster freight trains enabling more freight to run between passenger trains; improved signaling systems, like shorter block sections and the European Rail Traffic Management System (ERTMS); and investments in longer crossing stations and new tracks.

3.2 Waterborne freight

The building blocks that are required to improve service quality and/or reduce shipment cost for waterborne transport, and thus increase its modal share are:

- Time in port savings (simplification and automation of all administrative issues);
- Online freight information platforms for all intermodal transport;
- Efforts to increase co-operation among the multitude of stakeholders in the intermodal chains;
- Reduction of damages or cargo losses;
- Research and development (R&D) for improved technology and optimisation processes;
- Fuel savings (by more efficient hull designs, engines and propellers).

An advantage for maritime transport vis-à-vis road and rail transport is that capacity increases at the system level are usually less costly, since the connections between ports are largely free. Measures to increase intermodal capacity include reduced time for transshipments (automated technologies), increased storage capacity in ports, improved punctuality and increased capacity of waterborne vessels. R&D efforts to improve transshipment technologies are important.

3.3 The internalisation of external costs

Pricing of the external effects of transport has for a long time been considered a key component in achieving a sustainable European transport system (EC, 2001; EC, 2008a; EC, 2009), not least because it would help to deliver a modal shift from road to rail and waterborne freight (EC, 2011a). It is important for such internalisation to address external effects in the form of congestion, accidents, air pollution, noise, infrastructure wear and climate impact.

Although there are large deviations in specific cases, in general the level of internalisation is currently lower for road freight than for rail and waterborne freight. The level of internalisation in the EU27 is 55-75% for heavy trucks (>32 tonnes), 90-95% for freight trains and 85-90% for IWW transport (EC, 2008b).

4 Policy packages towards achieving the long-distance freight goal

The long-distance freight roadmap outlines two potential policy packages; alternative strategies that may be used to reach the White Paper goal. Rather different actors need to be involved in achieving the White Paper goal. The role of the EU can change significantly, depending on the kind of measure that needs to be applied. However, policy package elements need to be implemented in a coherent way and overall coordination is required. The EU can play an important role, but in particular corridors it is crucial that private actors (e.g. port authorities, train operators etc.) are involved as well, and that clear and transparent roles and leadership are assigned.

4.1 Policy package A: More efficient use of existing infrastructure

In policy package A the main emphasis is on making smaller investments (longer sidings, more powerful locomotives, upgrading of inland ports, seaports, IWW, etc.) in order to increase capacity of rail freight and waterborne transport, and stimulate an efficient use of existing infrastructure. The shift to waterborne transport will be high in this package (30-50% of freight shifted from road transport) since increasing capacity of waterborne transport requires comparatively small infrastructure investments. Push measures – making

road freight pay for its external effects – are important, especially because the current uninternalised effects are particularly large for road freight (EC, 2008b). Although this policy package focuses on efficient utilisation of existing infrastructure, some new infrastructure is built, including port transshipment facilities and port hinterland rail connections.

4.2 Policy package B: Large scale investments in new rail tracks

This policy package entails a radical increase in rail capacity. Many new tracks are built, in most cases for high-speed rail (HSR) passenger trains. This allows for a separation of slow and fast trains, which yields a high capacity increase (with two parallel double tracks, instead of one, capacity increases by a factor 3-4). Focus is on making full use of the economies of scale associated with rail transport.

The high capacity freight corridors connect mega-hubs, forming a highly efficient industrialised multimodal transport system. This may be an economically-efficient system in the long-term (although the initial investments are large), but only if the transport demand matches the huge capacity of the network. In this package, waterborne transport receives less attention (15-30% of freight shifted from road transport). If this package is accepted and implemented, both the HSR and the freight goals of the White Paper may be achieved, even in a scenario with strong drivers for (road) freight growth.

5 Applying the policy packages on two important freight corridors

The freight goal is expressed as an average for the EU. Given the substantial geographical and economic diversity among European countries and regions, the TRANSFORuM long-distance freight stakeholders made a selection of highly relevant concrete corridors, as per the White Paper stipulation, for demonstrating the elements of the roadmap. The cases shed light on the question to what extent the policy packages can be 'customised'. This helps to understand the relevance of policy measures in different contexts. With this selection, we cover a wider range of rather different situations of European goods flows with clear growth prospects.

5.1 Case 1: The Rhine-Alpine corridor

Operating along the major transport axis across the Netherlands, Belgium, Germany, Switzerland and Italy, huge amounts of Europe's freight traffic volume are handled along the Rhine-Alpine Corridor. With some 100 terminals on the entire route, the corridor connects the ZARA seaports (Zeebrugge, Antwerp, Rotterdam and Amsterdam), as well as ten major inland ports with the Mediterranean port of Genoa. It is a long-established route for North-South freight and a core element of the Trans-European Transport Network (TEN-T). It is well connected to other TEN-T corridors (Rhine-Alpine; Atlantic, North Sea-Mediterranean and Rhine-Danube). The overall length of the Rhine-Alpine Corridor is 1,400 km. Many efforts were undertaken in the last decades to improve traffic flows along the corridor. In the meantime, with the European Economic Interest Grouping (EEIG), a management structure was implemented that is dedicated to the corridor.



Figure 2: Area of the Rhine-Alpine corridor (Verband Region Rhein-Neckar, 2015)

Road, rail and waterborne transport play different roles in the different sections of the corridor. With the Alps, it includes a section where rail is the only alternative to road. North of the Alps, both rail and water provide alternatives.

With the Betuweroute in the Netherlands and the Lötschberg and Gotthard tunnel in Switzerland, the Rhine-Alpine corridor integrates some of the most important infrastructure projects in Europe. Shifting around 700 million tonnes of freight per year in an area involving some 70 million inhabitants (Saalbach, 2012).

Based on the analysis and calculations presented in the long version of this roadmap it can be concluded that much progress can be made relying solely on policy package A – smaller investments to increase capacity. Measures that stimulate an efficient use of infrastructure should be implemented promptly.

However, given the envisioned growth rates in the freight sector, fully achieving the 30% goal in this corridor is hardly possible without significantly extending the infrastructure, as it is envisioned in policy package B. For some of the crucial bottlenecks in terms of rail capacities, it is not only financial resources that impose a barrier for progress. An even higher barrier seems to be the large public resistance in some areas such as Southwest Germany, which could delay the realisation of increased capacity for decades. Political communication, awareness raising about the sustainability of freight rail, and participation of relevant actors in early stages of development are all aspects that need to be considered in policy package B as well.

It is also important that the capacity on all parts of the corridor is adequate in order to remain competitive. It must be clear that any part of the corridor that has its own specific needs should be accounted for in the planning process. Bearing this in mind, the goal set of shifting 30% from road to rail (and the required 180% increase in rail freight by 2050) is only within reach if all countries along the corridor develop infrastructure adequately. Furthermore, a coordinated planning process is crucial to avoid bottlenecks that may affect the economic development of the entire region.

5.2 Case 2: Netherlands – Poland

The Netherlands – Poland corridor also includes the ports of the ‘North Range’, but in contrast to the first case consists only partly of the official TEN-T network. Besides the West-East Corridor also includes many other parallel rail and maritime connections and, in addition, has significant IWW potential to be extended in the future, if significant modernisation takes place. The case illustrates the important role of maritime transport for serving the East-West connection.

Although parts of the West-East route are not well developed, the connection between the port of Rotterdam and Poland is one of the best developed transport corridors in the EU (covering an area with 85 million people), especially inland transport on the route Rotterdam – Duisburg – Frankfurt Oder and maritime transport from Rotterdam to Gdańsk/Gdynia by short sea shipping, ocean lines and feeder services.

The route is also important for longer-distance transport, especially to Belarus, Ukraine, Russia, Kazakhstan and the Black Sea Area.

Based on interviews and stakeholder discussions it was perceived that the waterborne element of the freight goal is most relevant for policy package A and focusing primarily on the improvement of existing infrastructure and service quality will help to achieve the modal shift required.

On the Poland–Netherlands corridor most of the rail container services fulfil current market expectations and offer two-day carriage on average or three-day maximum. All maritime connections pass through few other ports or go directly, thus offering relative short transit time (3-6 days). This aspect therefore does not need much improvement. In addition, the existing schedules are quite dense and can be modified by ship owners at short notice when required.



Figure 3: Poland – Netherlands trade connections (PCC intermodal transport, 2014)

6 Key messages

Most stakeholders consulted in TRANSFORuM consider the 30% 2030 target to be achievable, whereas there were more doubts about the 2050 target. Three main fields of action were identified: make rail freight more competitive; make waterborne freight (maritime and IWW) more competitive; and create a level playing field between modes.

The crucial question is how to achieve progress in these different fields. Since the goal is rather challenging, almost all of these measures/initiatives need to be

combined. However, the intensity of each will need to be adjusted to account for different external developments (e.g. economic growth, supply of fuels, etc.), as well as to different regions of the EU. The balance between building completely new infrastructure and upgrading existing networks is a case in point. A more rapid growth of freight volumes will (ceteris paribus) tend to shift the balance towards building new infrastructure and vice versa. In a similar way, increasing strains on public budget (due, for example, to an ageing population), will require more emphasis to be put on cost effectively upgrading the present transport system.

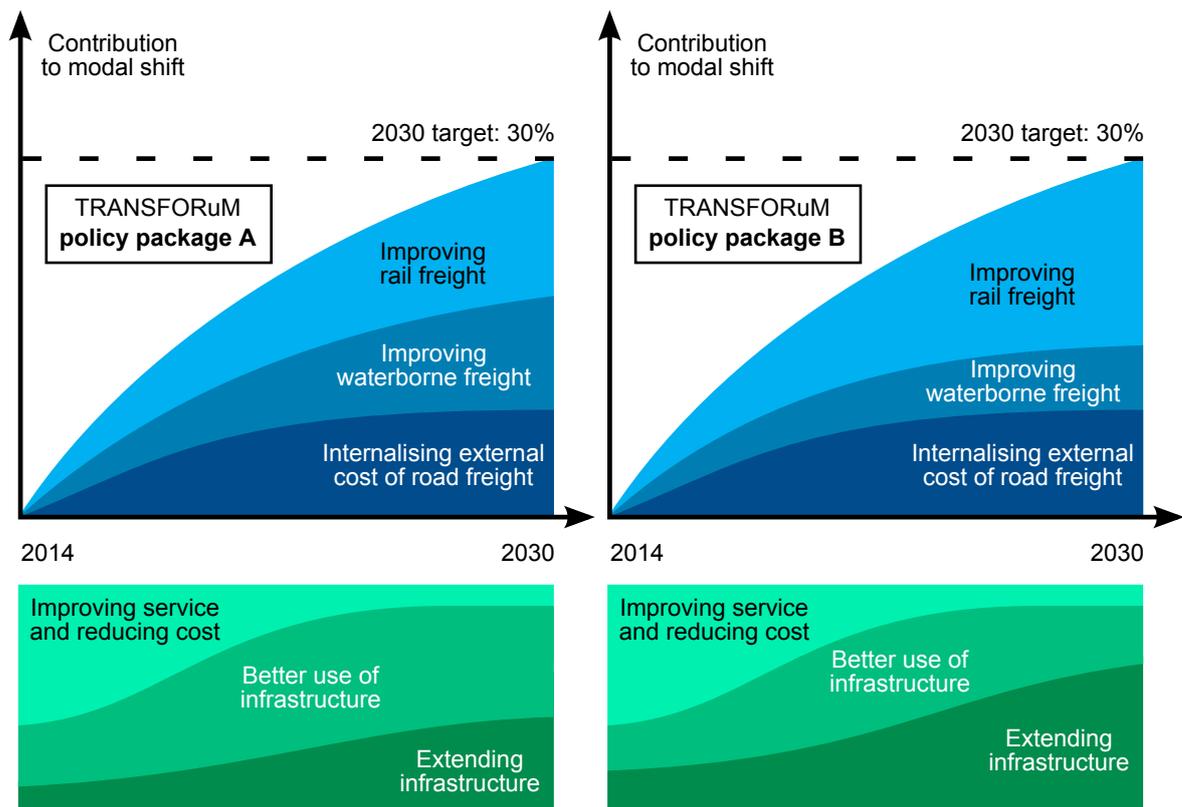


Figure 4: Feasible pathways towards the White Paper goal

7 Summary

1. The discussion with stakeholders revealed that a stakeholder forum is needed to enable significant changes to the structure of freight transport. It was pointed out many times that communication and coordination between responsible organisations is indispensable for coming close to the targets in the envisioned timeframe.

> EU and Member States to trigger and coordinate stakeholder collaboration.

2. The focus on corridors is necessary. Establishing freight corridors is definitely a useful approach, not only for technical reasons but also for enabling the organisational structures that are needed to convene the relevant actors in a coherent and efficient way. Efficient governance structures with clear leadership are needed to successively develop the corridors.

> EU to further improve the corridors by offering financial support and promoting efficient management structures.

3. Efficient feeder transport and smoothly working terminals are also essential components. The last mile problem is a serious barrier for modal shift and it might be overlooked by approaches focusing only on corridors. More efficient transshipment technologies in ports and other hubs are also necessary to reduce intermodal transport costs.

> EU and Member States to support city logistics service centres (CLCS), planning and market introduction of innovations, e.g. automatic transshipment facilities in hubs.

4. Substantial capacity increases may be achieved by making more efficient use of existing network/infrastructure, without costly extensions of infrastructure. Measures cover, for instance, building longer sidings and purchasing more powerful locomotives in order to allow for longer trains, or introducing faster freight trains that will increase capacity on lines with mixed traffic. A requirement for success here will also be cooperation among intermodal freight operators in order to fill the longer trains. Finally, running longer trains must be economical for the operator, and so the structure of fees needs to be adjusted.
- > EU and Member States stimulate and financially support a range of small cost-efficient investments, including improved track maintenance, which together may have a substantial effect on capacity. EU to promote efficient charging schemes.*
5. IWW and short sea shipping still have substantial potential to be tapped with comparatively small funding needs. A key measure in a scenario of tight public budgets is to raise the capacity of inland ports by careful spatial planning and financial support. The bottlenecks for short sea shipping are mainly the capacity and efficiency of ports and hinterland connections.
- > EU, Member States and cities to jointly raise capacity and efficiency of inland ports and sea-ports. Also to raise status of IWW as a modern and sustainable transport mode.*
6. Port hinterland development by financing new dedicated freight tracks is important. Goods that arrive by ship need transshipment anyway, whether it is to trucks, trains or barges. With new transshipment technologies, the extra (expensive) transshipments required can be reduced from two to one, compared to a shift from dedicated road transport.
- > EU and Member States to contribute to financing infrastructure, but in return request ports to achieve a certain (high) modal share for rail and waterborne in hinterland transport.*
7. A different way of reaching the long-distance freight goal would be large-scale investments in new rail tracks, as highlighted in policy package B. Such a development might be triggered by a will to radically extend the HSR passenger network, which would entail a significantly increased capacity for freight trains (and local/regional passenger trains) on old tracks. Such a scenario would require massive public funding. One of the few alternatives to achieve this would be to shift funding from road investments to investments in rail and waterborne transport.
- > EU and Member States to raise awareness of the importance of modal shift.*
8. If infrastructure is to be extended, it is important to communicate the overall benefits to the public and other stakeholders. The linkage between a high quality transport system and improved quality of life needs to be at the centre of debates.
- > EU and Member States to trigger public debates about freight and to increase acceptance of corresponding investments.*
9. Achieving a level playing field across modes is essential. The EU and Member States can level the playing field by implementing two types of measures. The first is to levy taxes that fully internalise the external effects of road transport (and of other modes), e.g. in the form of heavy vehicle fees such as those used in Switzerland. The second type covers a much better enforcement of current regulations in road transport. This refers to weight limits, speed limits and working time rules.
- > EU to trigger and coordinate further action in this field. Member States to levy appropriate fees and to strengthen control of existing regulations and imposing more effective punishments.*

10. Improved quality of services and reduced costs are necessary to attract customers to rail and waterborne transport. Continued and synchronised liberalisation of rail freight is one of the measures needed. Improved maintenance of rail tracks and IWW are also paramount in order to achieve satisfactory reliability and punctuality. Cooperation and alliances between actors need to be promoted to achieve customer-friendly intermodal services and utilise economies of scale. The booking of intermodal transport must be easier. 'One stop shops' that embrace all modes in the intermodal chains are much needed.

> EU to accelerate and monitor progress in this field and support good practices that enable a high level of cooperation in a liberalised market. The setting up of 'one stop shops' should be facilitated.

- M5: Shifting investment funding: 50% to rail, 50% to road (compared to 30%-70% in 2010)
- M6: Dedicated network for freight in 50% of the corridors
- M7: Extension of 90% of the corridors finalised
- M8: One stop shops established
- M9: 1,500 m long trains are widespread across the EU
- M10: Improved maintenance of infrastructure to ensure reliability
- M11: At most ports terminals are not a major bottleneck
- M12: Share for rail and waterborne transport in port hinterland transport exceeds 70%

8 Milestones

- M1: Stakeholder Forum established
- M2: Level playing field, all external costs are internalised
- M3: ERTMS fully operational
- M4: CLCS as a common element of EU transport systems

Based on the key findings of the project, the roadmap shown overleaf in Figure 5 was developed. It identifies key milestones, which are ordered according to which actors have primary responsibility for their realisation. Since several of the milestones are associated with considerable inertia, rapid action is necessary. As with the main messages, the importance of the respective milestones will vary with different external developments.

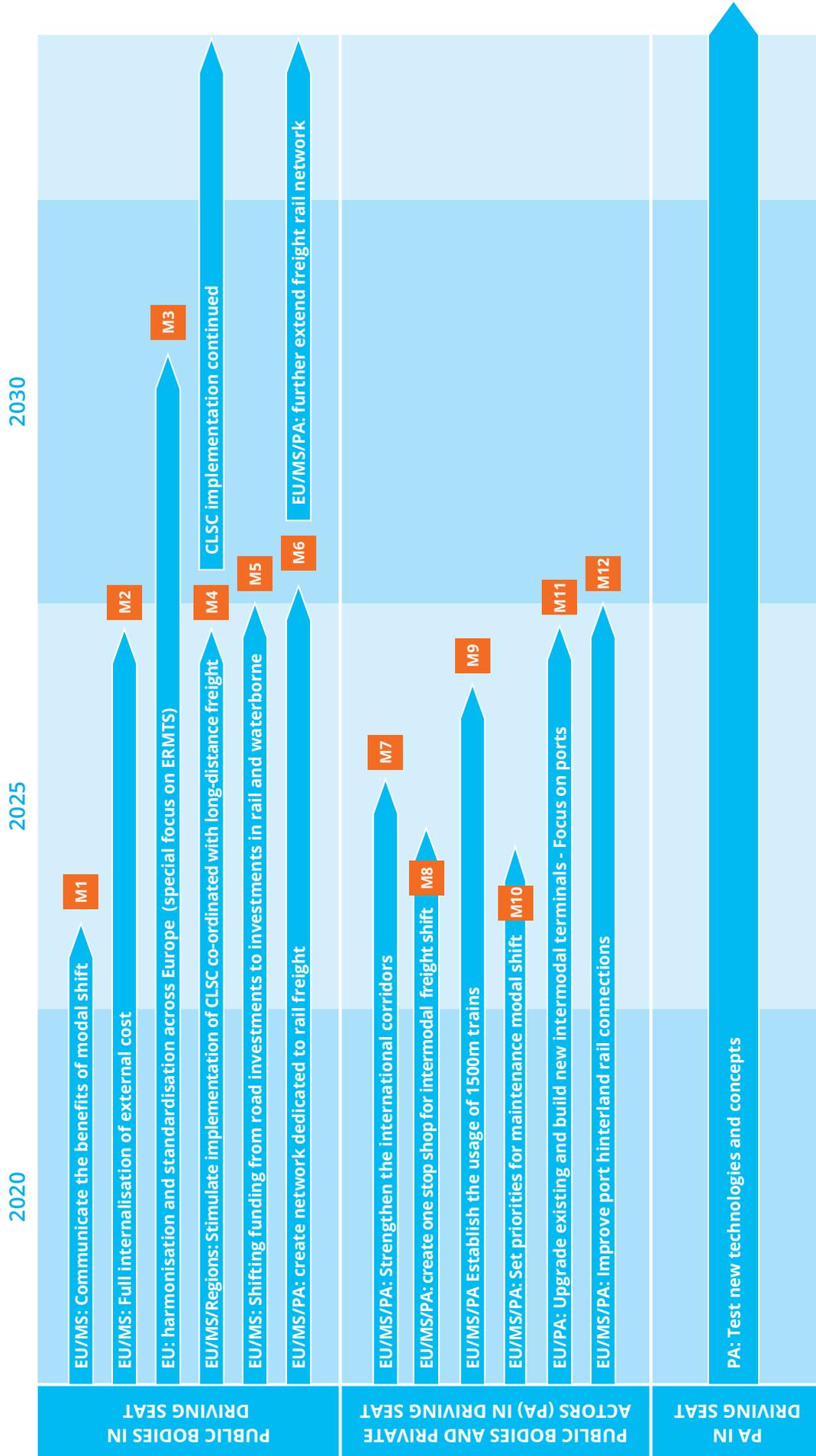


Figure 5: Long-distance freight roadmap

9 References

- European Commission, (2001). White paper – European transport policy for 2010: time to decide.
- European Commission, (2008a). Strategy for the internalization of external costs. COM(2008) 435 final.
- European Commission, (2008b). Impact assessment on the internalisation of external costs. SEC (2008) 2208.
- European Commission, (2009). A sustainable future for transport: Towards an integrated, technology-led and user-friendly system. COM (2009) 279 final.
- European Commission (2011). Connecting Europe: The new EU core transport network, MEMO/11/706 - 19/10/2011 Retrieved October 17 2014, europa.eu/rapid/press-release_MEMO-11-706_en.htm
- European Commission, (2013a). EU Energy, Transport and GHG Emissions Trends to 2050 Reference Scenario 2013.
- European Commission (2013b) Trans-European Transport Network: TEN-T Core Network Corridors.
- KTH Railway Group, (2013). Roadmap for development of rail and intermodal freight transportation – high capacity transports for rail – green freight train, Forum for innovation in the transport sector, Stockholm, April 2013.
- PPC intermodal transport [Figure 3]. (2014). Retrieved November 14 2014 from www.pccintermodal.pl/bazy/pccintermodal.nsf/id/EN_Intermodal_connections
- Verband Region Rhein-Neckar [Figure 2]. (2015). Retrieved February 15 2015 from www.m-r-n.com/en/home.html. See also <http://code-24.eu/>

ACRONYMS AND ABBREVIATIONS

EEIG	European Economic Interest Group	Ro-Ro	Roll-on-Roll-off
ERTMS	European Railway Traffic Management System	TEN-T	Trans-European Transport Network
GHG	Greenhouse gas	TKM	tonne-kilometre
IWW	Inland waterway	ZARA	Zeebrugge, Antwerp, Rotterdam, Amsterdam
R&D	Research and Development		

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about the Long-distance Freight
roadmap**

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