ABOUT THE FUTURE PERSPECTIVES OF INLAND WATERWAY FREIGHT IN CENTRAL EUROPE

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ABSTRACT

The paper collects arguments to present that the consumption- and emission characteristics of the rail and inland navigation modes are very close to each other. Considering that these modes are able to transport more or less the same groups of goods, it is a much better way to develop them within an integrated transport policy than trying to bring arguments for one of them against the other.

1 INTRODUCTION

It is a good choice, that the 6th SoNorA Think Tank meeting deals with the rail freight and the inland waterway freight issues together, giving a chance to avoid supporting one of those transport modes against the other. This paper presents historical, geographical, consumption and emission characteristics of the two modes for promoting arguments along an integrated transport policy and against a frequent one sided presentation of waterway advantages.

The paper presents the appearance of the different dominant transport modes in a historical background and introduces a hypothesis that these tendencies are to be changing in the future. The next part underlines that statistical data do not prove the expectations about the unexampled low inland waterways emissions and consumptions. The last block compares the possibilities and practical circumstances of the Western, Eastern and Central European (landlocked) inland navigation, to show the differences between countries of different endowments, and to avoid an expectation to consider those countries with higher share of inland water freight as a target to achieve.

2 INLAND WATERWAYS WITHIN THE TRANSPORT SYSTEMS

Until the middle of the 19th century waterways were the main carriers of long-distance terrestrial(!) goods transport – the alternative was the animal-driven cart. Even on the rivers in the case of the upstream transport the human or animal haulage was prevalent.

The rail, the paved road, the automobile and the airplane all appeared as *new technical inventions*, and possibilities to take over the load from the previous actor. In the history of the past two centuries of the transport there was always a (time-to-time changing) *dominant transport mode*, and accordingly a dominant infrastructure that determined the possibilities of the transport ([1]; Figure 1).

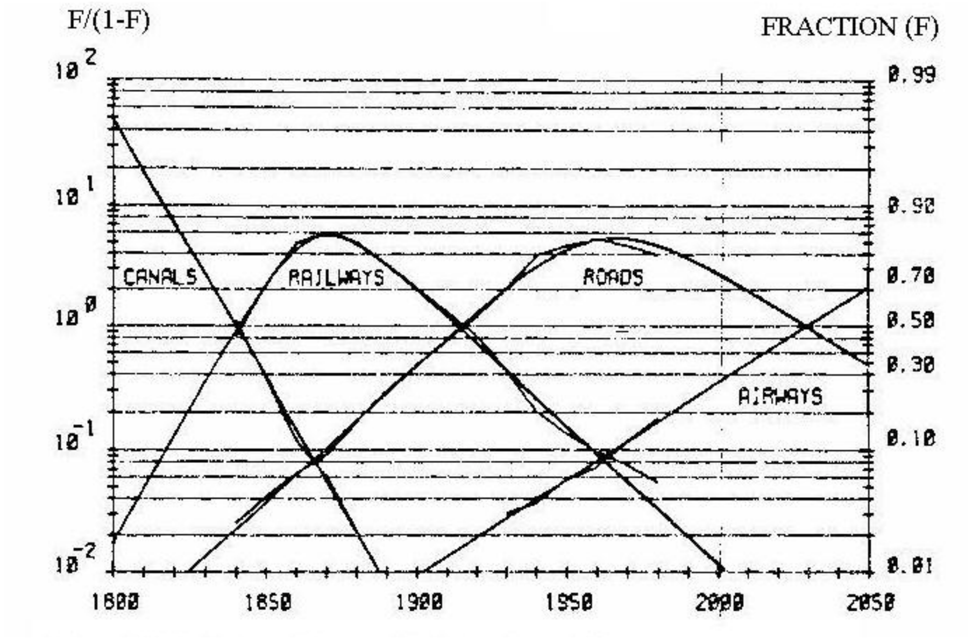

Figure 1: Substitution of transport infrastructures in the USA 1800-2050
(Fraction of the given mode in length of the network relative to the others) [1]

Not regarding the proportion of modes relative to each other, but the process of the growth of the infrastructure network of different transport modes, *Ausubel et al* [2] manifested that those modes coming later dispose with longer development period and more and more moderated dominance relative to the other modes (see Figure 2) Based on those results, we added a hypothesis, that the earlier ("outmoded") transport modes do not necessarily have to totally finish their cycle of development, rather stabilising it at a lower level. From such a hypothesis by the 21st century a mixture of modes has evolved, where each transport mode may have a given share from the total transport, without the sharp domination of a specific one competing with the others. We see that such an approach also suits to a post-modern paradigm, where a mixture of the existing heritage can be well coupled with new innovations, and the technology is used also to achieve the good amalgamation of the different segments. The task of the transport policy here is to promote the cooperation of the different modes in an integrated, co-modal transport system.

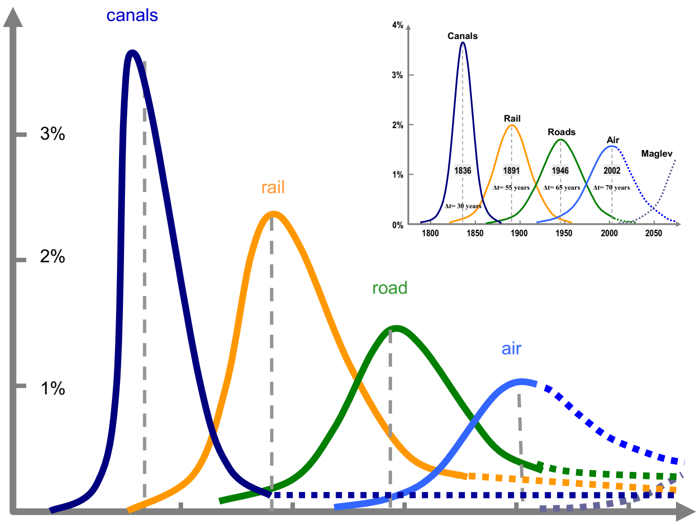

Figure 2: Mixture of modes in the 21st century. Based on the growth of the US transport system, 19th - 21st century (right upper corner) [3] who reproduced [2]

3 INLAND WATERWAYS: FIGHT FOR A BIGGER SHARE BASED ON UNCERTAIN STATISTICS

The present-day situation is totally different from those described above. Even the modes in a weaker position try fighting against the other modes, and achieving a traffic gain at the expense of those other modes, supposing a 0-sum game in the transport market, where the modal growth is an accepted target.

That is why a great portion of the existing background papers dealing with the inland waterways offer unbalanced argumentations for catching a bigger share in the transport market, without an extended analysis of either the integrated transport situation or the sustainability targets.

There are sustainability boundaries (pressure for less energy use, need of less emission output) that are really favourable for the rail and the navigation, and unfavourable for the air and road transport. Railways and waterways together should form those integrated transport segments that could offer transport policy level solutions for sustainability problems. If rail and water tries to rival for the goods instead, they both may miss those potential advantages coming from the integration, and also the whole economy is a loser in the game which is obliged to construct parallel capacities instead of integrated solutions.

The non-confirmed arguments that try to improve the positions of the inland waterways against the rail can even appear in official DG-TREN positions, using uncontrolled numbers. The main page of the inland waterways writes: “Its energy consumption per km/ton of transported goods is approximately 17% of that of road transport and 50% of rail transport” [4]. *Piekarski* [5] also refers to EC documents [6] writing: “European Commission studies indicate that with only one litre of fuel most vessels can transport one tonne of cargo over 127 km, in comparison to 97 for rail and 50 for road.”. The same numbers are presented on the figure, too ([5] Annex D, p. 118), referring to www.inlandnavigation.org; while now looking at that site we can already see another figure with slightly different proportions and with very different values relating to five litre of fuel use instead of one (Figure 3).

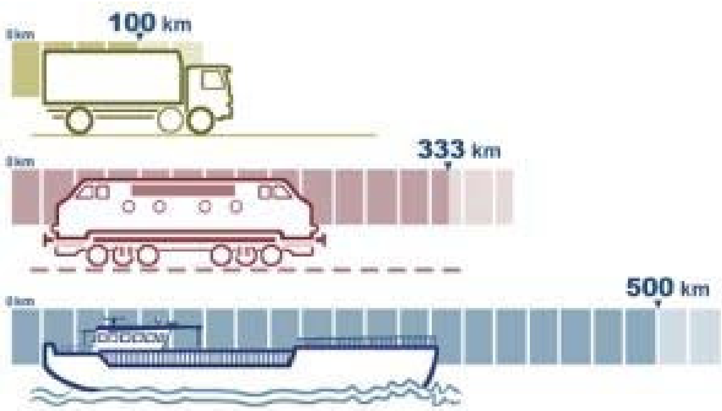

Figure 3: Five litre of fuel equivalent enables the transport of one tonne of goods over the above distances [7]. By those numbers 100 km transport needs 5 l, 1.5 l and 1 litre of fuel respectively

It is not easy to find those sources that can support any of these proportions with real numbers. Those international statistics publishing county level final energy consumption data by transport mode (Eurostat, UNECE etc.), can't distinguish the energy used for freight, so, first of all rail and road statistics say nothing on energy consumption per km/ton. To find data it is necessary to see single researches.

In Hungary the specific energy consumption of the water freight was really half of the rail until 1990 (ca 150 KJ per ton/km versus 300 KJ per ton/km; [8]). In that period the official statistics contained five times more ton/km marine transport performance than inland navigation. During the next five years the Hungarian state got rid of the Hungarian flag marine fleet, and by 1994 when the statistics covered necessarily the remained inland navigation, the energy consumption of the water freight changed to 600 KJ per ton/km – much worse than the rail that held the 300 KJ per ton/km value.

More extended and more recent comparison was made by *McKinnon* in the UK [9]. He measured CO_2 emission rather than fuel consumption, and found the average CO_2-intensity for rail freight operations in the UK was 14.5 g CO_2 per ton/km. This result was lower than other results he also surveyed and compared[1]. The emission depends to a great extent on the haulage and could be summarised as 15-20 g CO_2 per ton/km in the case of electric haulage and 35-40 g CO_2 per ton/km at diesel haulage. In the same time the freight on inland waterways emits 30-40 g of CO_2 per ton/km [14], [16]. As an average there is no difference between the specific emission of the rail diesel and the inland navigation, while the rail is better if using electric haulage. McKinnon summarised the average emission intensity for different modes as follows: air freight 1600 g of CO_2 per ton/km, vans 220, heavy trucks (>38 tons) 160, inland waterways 35, coastal shipping 25-30, rail 20 g of CO_2 per ton/km.

We don't have to accept the above results as something that can be generalised for the rest of Europe, but we can confirm the hypothesis that *practically there is no considerable difference in fuel intensity and in CO_2 emission intensity between the rail and the inland navigation, while they both represent a relative good performance within the transportation*.

[1] „For example, the Rail Emissions Model constructed by AEA Technology [10] for the SRA used a ratio of 20 gm of CO_2 per tonne-km for rail freight. The TREMOVE study, undertaken by the University of Leuven, [11] assigns a value of 33 gm of CO_2 per tonne-km for UK rail freight operations. Four other recent studies by NTM [12], WRI-WBCSD [13], INFRAS [14] and IFEU [15] suggest average ratios for European rail freight operations of, respectively, 17, 30, 38 and 18 (electric) / 35 (diesel) gms / tonne-km." [9]

4 INLAND WATERWAYS: ARE THERE WESTERN PATTERNS TO FOLLOW?

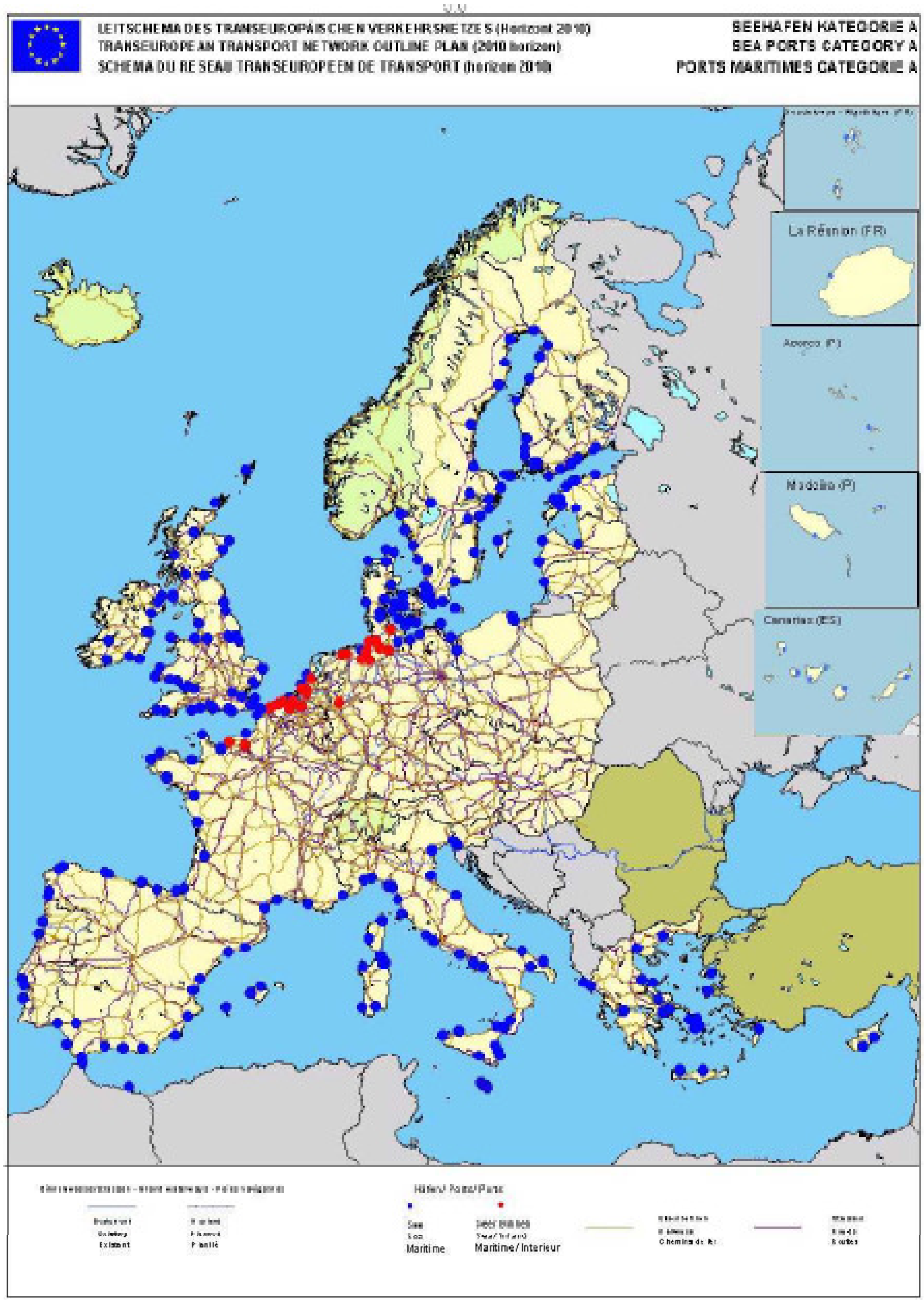

Figure 4: First category sea ports and sea/inland ports in Europe [17]

Besides the fuel-consumption and emission arguments, there is another frequent argument for the development of the share of the inland navigation in freight transportation, namely the example of countries, where this proportion is much bigger. There are different statistics, (pipelines included or not, tonnes or ton/kms etc.) here we use the Eurostat 2009 statistics for the year 2006. By that basis the share of the inland waterways freight transport performance (ton/km) within the total freight performance was 5.6 % for the EU-27s; while the same share for the EU-15s was 6.5 %.[18] In Hungary the same number was 4,5 % in that year.

Does this mean that Hungary is lagging behind Europe, or that the new members have to catch up with the EU-15s in inland navigation? If we study how that 6.5 % was split between the countries of the EU-15, we can find that there are three leader countries of the EU-15 (Netherlands 32.3 %, Belgium 14.7 % and Germany 12.8 %) – while the other EU-15 countries have smaller inland water freight proportion than the EU-27 average or even than that of the Hungarian share. In the eastern side there is also one country, Romania with 10 % as leader in navigation.

What are the common characters of those leaders? All of them are maritime countries, also with important river mouths. As for the western three, they also dispose of old canal systems parallel to the sea-shore between the rivers, forming a network of waterways (generally from the early 19th century on). Looking at the ports (see Figure 4) there is also a distinction between sea-ports and sea/inland ports, as especially in the case of the three above countries the big ports are far into the continent, in the horn-mouths of the rivers [18]. In the case of Romania the situation is different, the Danube has a delta mouth, not offering a good sea port, instead Constanta grew to a big Black Sea port, and it was recently linked to the Danube with a canal.

Even on the Rhine, there is a ten times difference between the navigation performance of the river-mouth and a cross-section 700 km upstream. There is also a difference what economic navigation means depending on different shapes of river cross-sections. On narrow and deep rivers a different fleet evolved, than on the wide and shallow eastern European rivers.

Cheap water freight means, that if the goods are in the well loaded barge, the movement of the goods is cheap. If the fleet and the river-bed is different, or the fleet and the ports are missing, or if there is no market for those goods – the cheap transport has no meaning any more, until all those conditions are created.

*

Here we can stop with comparative arguments and turning rather to a sustainability background. On the one side sustainability means that we have to be able to accept that we need to adapt our activity to the endowments, and we can’t keep our previous plans at any price. On the other side sustainability really offers a good opportunity to the low-emission transport modes as rail and waterborne transport, but it needs an integrated policy approach to implement new measurements for promoting both those modes. It is not enough to refer to sustainability argument, and behind that trying to pass old, outmoded plans in favour of an old and outmoded transport model.

There exist already good surveys to support a more detailed analysis. We can learn, it is not enough to sell wishful thinking as traffic forecasts [19]; it is not enough to deny emissions coming from waterborne transport for showing a better comparison [20]. It is also necessary to study not only the advantages, but the weaknesses of inland waterways, too, (good example is [5]) because it is not against the other modes, but along the common possibilities of the rail- and waterways that a positive scenario can be constructed for the future transport policies.

5 CONCLUSIONS

The different documents promoting the development of the inland navigation are all count on the limitation of the future resource use and emission, but rarely draw more conclusion, than that it is favourable for the inland navigation. This paper attracts attention to the fact that the myths of the unexampled low energy use and low emission of inland waterways is not proven in the practices, and an integration rather than a competition with rail would promise more results for the future.

Proposals that try to show countries with high share of inland waterway fright as quantitative examples to follow to other countries are also false. Those countries all dispose with special endowments and old traditions of navigation that can’t be copied by land-locked countries or countries with very different background. In that context the adaptation to the environmental endowment is again a good point of orientation.

The sustainability approach can really offer a good possibility for the development of the inland waterways, but this transport mode can gain from that only by conforming itself within an integrated transport policy frame, and in close cooperation with other modes instead of competing against them.

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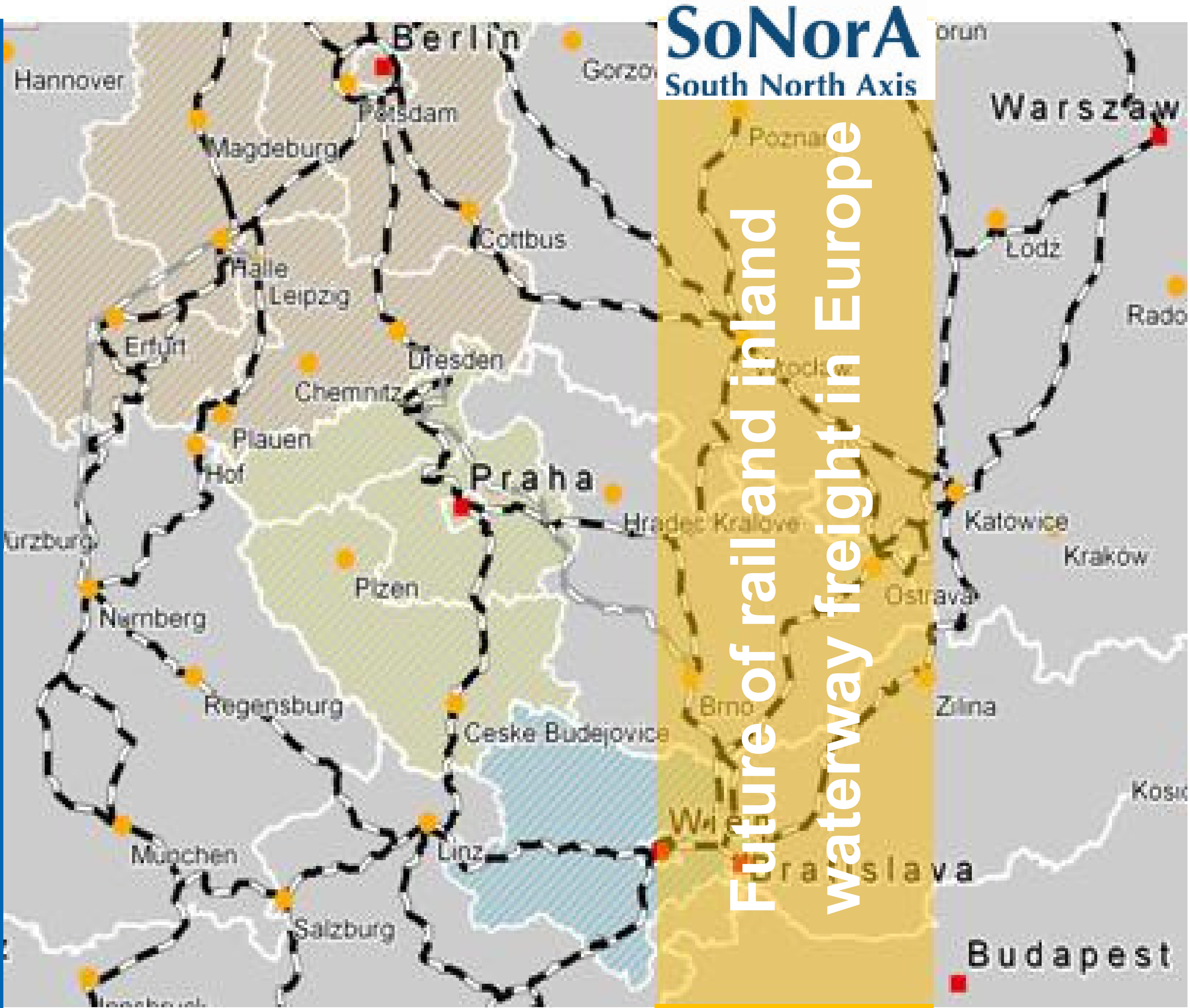

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