Quantification of the need to retrofit freight wagon fleets in Germany and member states of the European Union in light of the differing legal frameworks

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Rail freight transport accounted for approx. 12% of total freight transport in Europe in 2015. Due to the increase in transport services in rail freight transport the burden through rail freight transport noise pollution increased significantly in Germany and other European countries in recent decades. To ensure that rail freight transport continues to be one of the most environmentally friendly modes of transport, traffic with “noisy” freight wagons has been banned on the German rail network from December 2020 onwards.

This working paper quantified the need to retrofit the freight wagon fleets in Germany and other European countries. Applying different legal scenarios that are based on the ban of “noisy” freight wagons in Germany, Switzerland, the Netherlands and Austria. The analysis focuses on different data sources (e.g. ECVRR, URR and NVR) and interviews with wagon keepers and RUs.

The analyzed data reveals that 712,000 freight wagons are registered as active in Europe, with 642,287 of them capable to operate on standard gauge (1,435 mm). 28 % of the European rail freight transport is undertaken on the German rail network. This figure reveals how important the German freight rail transport is in the European context. Germany has with approx. 166,000 freight wagons by far the biggest fleet of active wagons. Overall there are approx. 1,000 freight wagon keepers and among them 247 are registered in Germany. The largest wagon keeper group in Europe, with approx. 80,000 active freight wagons, is DB.

The data base did not allow to exactly identify the brake systems off of all freight wagons, as this information was not existent in all data sources. Therefore, an estimation with regard to equipped brake system based on the construction year was carried out. According to the TSI Noise all freight wagons that have been built or registered after 2009 are equipped with a “silent” brake system (either composite break blocks or disc brakes). Based upon this estimate and the few information available in the data sources it was possible to determine that 27 % of active freight wagons in Europe are fitted with a “silent” brake system. In Germany, approx. 44 % of the active freight wagons are equipped with “silent” brake systems. In addition, information from the SWDB registry and the Impact Assessment were used to analyze the brake systems.

Based upon the average life cycle of a freight wagon of 45 years it was forecasted that the number of freight wagons for 2021 will be 685,382 wagons and for 2030, it will be 563,787 wagons. Furthermore, the required number of freight wagons was determined based upon the projected operational performance and hauling capacity. According to this approach, the number of required freight wagons for the German rail freight transport in 2021 are 190,935 wagons and for 2030 are 161,480 wagons. The demand for rail freight transport in Germany, Switzerland and the Netherlands resulted in a total of 224,704 freight wagons for 2021 and 198,558 freight wagons for the year 2030. In the final step, rail freight transport traffic in Austria was also considered for the forecast. This resulted in a demand for freight wagons of 262,023 in 2021 and 241,445 in 2030 for Germany, Switzerland, the Netherlands and Austria.

Given the projected number of freight wagons and the determined number of “silent” freight wagons, it was possible to estimate the arising costs to retrofit and for operations differentiated by the different legal scenarios. For the rail freight transport in Germany, the accounting costs for retrofitting and operations during the year 2018 to 2021 will be approx. EUR 765 million. Adding Switzerland and the Netherlands the incurring costs until 2021 will sum up to approx. EUR 913 million. If rail freight transport in Austria is also considered the incurred costs are approx. EUR 1,034 million. The additional costs that occur for the targeted use of “silent” freight wagons in countries where a ban of “noisy” wagons is planned was also identified. To pool foreign freight wagons for traffic in Germany until 2021 approx. EUR 5.4 million would have to be spend. The ban of “noisy” freight wagons in Germany, Switzerland and the Netherlands incurs costs of approx. EUR 5.5 million for wagon pooling. Approx. EUR 8.1 million would be necessary for pooling freight wagons if, in addition, Austria plans to ban “noisy” freight wagons.