FACT SHEET NO.: 5 / 3 **PERFORMED BY: PRO**

A GENERAL INFORMATION

A 1	**Category**	**Efficiency standards & Flanking Measures**
A 2	**Subcategory**	**Standards - Environment**
A 3	**Transport policy measure (TPM)**	**Noise emission standards SEC(2008) 2203, SEC(2011) 1505**
A 4	**Description of TPM**	**Introduction:** Noise emissions, caused by humans, animals or machines disrupt the activity or balance of human or animal life. Particularly noise from road traffic, but also from rail and aviation, is a major problem in urban and suburban areas. Noise represents the third biggest environmental burden causing disease (after air pollution and exposure to smoking). The abatement of noise is necessary not only for comfort for residents near for instance motorways, but also because of other important health effects such as cardiovascular diseases and cognitive impairment. Research determined that during the day people start to get moderately annoyed by noise at 50dB (A) and seriously at 55 dB(A). [1] [3] **Noise emission standards:** Currently, legislation for noise emissions is different between and within member states. This is time-consuming, expensive and negatively effecting the internal market (with high bureaucracy effort leading to frustration and additional prodcution costs). It is therefore necessary to harmonize rules at the EU level including the limitation of the noise emissions from transportation. [6] This TPM will solely assess noise pollution from road and rail transport. SEC(2008)2203 assumes that rail noise emission can be reduced by 8 dB(A) in average by retrofitting wagons with low noise blocks **What causes noise emissions?** Noise from rail transport is basically caused by the wheel - rail contact. Roughness of rails and train wheels cause noise emissions. Higher rail roughness, caused by intensive traffic and by the use of damaged wheels, will lead to increasing noise emissions. [5] Noise caused by road transport is generated by many sources, like tyre-road noise, power train, engine noise and exhaust noise. [6]
A 5	**Implementation examples**	- Road vehicle noise is covered by two European directives. Motor vehicle noise emission has been covered by legislation since the 1970s (Directive 70/157) and tyre-road noise since 2001 (Directive 2001/43). - Railway noise is addressed by directives on railway interoperability for high-speed rail (Directive 96/48/EC) and conventional rail (Directive 2001/16/EC), which provide a legislative framework for technical and operational harmonisation of the rail network.
A 6	**Objectives of TPM**	The objective of this TPM is to ensure a high level of health and environmental protection for European citizens while ensuring the good functioning of the internal market for road and rail transport. [5] [6] The current legal framework is insufficient (mainly because measurement methods do not reflect reality and limits are too weak/low to solve the problem) to solve noise pollution and therefore needs to be replaced based on new standards and testing procedures. [2]
A 7	**Key changes concerning:**	
A 7.1	- Choice of transport mode / Multimodality:	A minor change to slow modes can be expected (minor because of the limited competitiveness between road/rail transport and slow modes), because of rising transport costs for road and rail transport and increasing attractiveness of slow modes. Although it is questionable whether less exposure to noise a reason is to switch modes.
A 7.2	- Origin and/or destination of trip:	No key changes
A 7.3	- Trip frequency:	No key changes
A 7.4	- Choice of route:	No key changes
A 7.5	- Timing (day, hour):	No key changes
A 7.6	- Occupancy rate / Loading factor:	No key changes
A 7.7	- Energy efficiency / Energy usage:	Traffic management (mainly based on technology used to optimise traffic flows) leads to more energy efficient driving behaviour (less petrol use, tire weir, etc.). Trains will be forced to run smoother which is beneficial for their energy consumption. [5] [6]
A 8	**Main source**	[5] rail [6] motor vehicles

B IMPACTS

B 1 OVERVIEW ON IMPACTS

		AFFECTED SEGMENTS															Geographical level		Source	
		Passengers					Transport operators													
		Road	Rail	Air	Public transport	Slow modes	Road	Rail	IWW	Air	Maritime	Public transport	Employees in transport	Residents	Economy	Public bodies	Society	1st level	2nd level	Source of assessment	Spatial level of source
B 1.1	**Summary**																	N	I	S	I
B 1.2	**Summary: Income groups**																				
B 1.3	**Summary: Age groups**																				
B 1.4	**Summary: Disabled people**																				
B 1.5	**Summary: Gender groups**																				
B 1.6	**Summary: Ethnic groups**																				

- B 1.1 **Summary**
  - Road and rail passengers will benefit from improved comfort, due to more quiet road vehicles and trains, while travelling. On the other hand, transport costs will rise due to higher production costs for transport operators (which will charge these higher costs to the consumer).
  - Slow modes in urban areas (where noise pollution is high) will benefit significantly from noise emission standards. Walking and cycling will become more attractive and users will notice a higher level of comfort while travelling.
  - In particular if the requested adjustment period is relatively short, high development and implementation costs will occur to transport operators (producers). [2]
  - Research and development is needed to meet new standards which will demand for more highly educated workers [6]. On the contrary, higher production costs will lead to higher prices for road and rail passengers which negatively effects production (and the amount of jobs) [2].
  - Given the substantial negative impact of noise pollution in urban areas, noise emission standards are highly favorable for residents (especially those near motorways and busy railroad tracks) and society (reduced health costs).
  - If noise emission standards will lead to end-of-pipe measures (for instance noise barriers), then this will change the impact of the TPM (mainly higher costs for public bodies). The cost effectiveness of at-source measures is significantly higher compared to end-of-pipe measures [4].
  - Finally, public bodies will face reduced maintenance costs for railway infrastructure. New emission standards will demand smoother braking(systems) for trains which lead to less friction and therefore less damage to rail infrastructure. This will save public bodies (mainly responsible for railway infrastructure) money. [5]
- B 1.2 **Summary: Income groups**
  - Night shift workers will significantly benefit by lower transport noise emissions. [EE]
- B 1.3 **Summary: Age groups**
  - The health effects of noise are not distributed uniformly across society, with groups like children and elderly suffering most. One of the main reasons for this severe impact is that both the elderly (and those already ill) and children are more affected by sleep disturbance (especially awakenings) than other social groups. [4]
- B 1.4 **Summary: Disabled people**
- B 1.5 **Summary: Gender groups**
- B 1.6 **Summary: Ethnic groups**

B 2 TRAFFIC IMPACTS

		AFFECTED SEGMENTS															Geographical level		Source	
		Passengers					Transport operators													
		Road	Rail	Air	Public transport	Slow modes	Road	Rail	IWW	Air	Maritime	Public transport	Employees in transport	Residents	Economy	Public bodies	Society	1st level	2nd level	Source of assessment	Spatial level of source
B 2.1	Travel or transport time																				
B 2.2	Risk of congestion	↘																L	R	E	
B 2.3	Vehicle mileage					↗												N		E	
B 2.4	Service and comfort	↗	↗			↗												N	I	S	I
B 2.I	**Overall impacts on social groups**																				
B 2.II	**Implementation phase**																				
B 2.III	**Operation phase**																				

- B 2.IV **Summary / comments concerning the main impacts**
  - Risk of congestion decreases on motorways where traffic management (realtime traffic information to prevent congestion and warnings on emissions) will be implemented to reduce noise emissions.
  - Service and comfort will increase for road passengers, rail passengers and slow modes. These modes will all benefit from the noise emissions standards. Road vehicles and trains will be more quiet which increases travel comfort. Slow modes in urban areas will be less exposed to traffic noise and will become more attractive. [3] [5] [6]
- B 2.V **Quantification of impacts**

B 3	ECONOMIC IMPACTS	AFFECTED SEGMENTS: Passengers: Road	Rail	Air	Public transport	Slow modes	Transport operators: Road	Rail	IWW	Air	Maritime	Public transport	Employees in transport	Residents	Economy	Public bodies	Society	Geographical level: 1st level	2nd level	Source: Source of assessment	Spatial level of source
B 3.1	Transport costs	↗	↗															N	I	S	I
B 3.2	Private income / commercial turn over												→					N	I	S	I
B 3.3	Revenues in the transport sector						↘	↘										N	I	S	I
B 3.4	Sectoral competitiveness								↗									N		E	
B 3.5	Spatial competitiveness																				
B 3.6	Housing expenditures																				
B 3.7	Insurance costs																				
B 3.8	Health service costs																				
B 3.9	Public authorities & adm. burdens on businesses						→	→								↘		N	I	S	I
B 3.10	Public income (e.g.: taxes, charges)															↗		N		E	
B 3.11	Third countries and international relations																				
B 3.I	**Overall impacts on social groups**																				
B 3.II	**Implementation phase**																				
B 3.III	**Operation phase**																				
B 3.IV	**Summary / comments concerning the main impacts**	Concerning road transport: - Vehicle maintenance costs will change. New wheels and braking systems will generate different maintenance costs per vehicle-km mainly depending on vehicle characteristics, type of operation, type of brake blocks. Old vehicles will have to be adjusted to new standards which leads to additional costs (replacement costs). [6] - Lowering noise limit values for road transport creates incentives for car producers (and other road transport producers) to develop quieter propulsion / vehicles. This will increase the demand for more funds and expertise for research and development, leading to more jobs in transport. [6] On the other had, higher prices of road vehicles will decrease the demand which has negative impact on employment in transportation (production). [2] - Production, development-, engineering- and testing-costs for road vehicles will increase due to new noise emission standards. This will lead to more employment and higher costs. These higher costs will probably be charged on vehicle prices and thus higher the transport costs for the road passengers. [2] Concerning rail transport: - Reduced maintenance costs for infrastructure: noise emission standards will lead to smoother braking(systems) for trains which lead to less friction and therefore less damage to rail infrastructure. This will save public bodies (mainly responsible for railway infrastructure) costs and will increase the revenues of operators [5]. - Production, development-, engineering- and testing-costs, which are relevant for new models or model upgrades in rail transport, will increase due to new noise emission standards [5]. It is uncertain who is going to pay for the additional costs (the user, the transport operator, both?). It is assumed that costs (short-term) will rise for both transport operators (leading to lower revenues) as for rail passenger (higher transport costs). [2] - Additional costs due to administrative burdens are not expected as the required manpower for testing and administration of new trains will not change significantly. [5] - 3rd level impact: Sectoral competitiveness of road and rail transport is negatively affected by higher costs. Transport by IWW will benefit from these increasing costs for road and rail transport.																		
B 3.V	**Quantification of impacts**	- The Dutch Noise Innovation Programme (IPG) calculated that every decibel of noise reduction at-source will save € 100 million in national expenditure on noise barriers and building insulation. [8]																			

B 4	SOCIAL IMPACTS	AFFECTED SEGMENTS: Passengers: Road	Rail	Air	Public transport	Slow modes	Transport operators: Road	Rail	IWW	Air	Maritime	Public transport	Employees in transport	Residents	Economy	Public bodies	Society	Geographical level: 1st level	2nd level	Source: Source of assessment	Spatial level of source
B 4.1	Health (incl. well-being)												↗	↑			↗	L	N	S / EE	I
B 4.2	Safety	→	→															N	I	S	I
B 4.3	Crime, terrorism and security																				
B 4.4	Accessibility of transport systems																				
B 4.5	Social inclusion, equality & opportunities																				
B 4.6	Standards and rights (related to job quality)																				
B 4.7	Employment and labour markets												→					N		S/E	I
B 4.8	Cultural heritage / culture																				
B 4.I	**Overall impacts on social groups**	- Especially nightshift workers will benefit by a reduction of noise emissions. [EE]																			
B 4.II	**Implementation phase**																				
B 4.III	**Operation phase**																				
B 4.IV	**Summary / comments concerning the main impacts**	- Well-being, mainly for residents in urban areas (where noise emissions contribute to a substantial amount of health problems) will increase considerably due to noise emission standards for road and rail transport. [1] - "Low-noise brake blocks" for trains are made of composite materials resulting in lighter blocks compared to current blocks. This means that the weight handled by wagon maintenance workers will be reduced and lead to improved working conditions and a reduced chance on health problems. [5] - Furthermore, no adverse impact on road safety is expected as the technical measures and modifications necessary to meet with the new test limit values are unlikely to affect any of the vehicles/trains active or passive safety features. [5] [6] - The needed research and development to adjust road vehicles and trains to new standards will demand more highly educated workers [6]. This rise of employment is not expected to last over a long period of time and employment will reach current rates within a few years. Furthermore, higher transport costs will reduce the demand (for road and rail transport), which has a negative impact on employment. [2] - Especially nightshift workers will benefit by a reduction of noise emissions. [EE]																		
B 4.V	**Quantification of impacts**	- Passenger cars and lorries are responsible for 90 % of the total social costs of road and rail traffic noise in Europe. [7] - The social cost of road traffic noise in the EU27 is estimated to be at least € 38 billion per year. [7]																			

B 5	ENVIRONMENTAL IMPACTS	AFFECTED SEGMENTS: Passengers: Road	Rail	Air	Public transport	Slow modes	Transport operators: Road	Rail	IWW	Air	Maritime	Public transport	Employees in transport	Residents	Economy	Public bodies	Society	Geographical level: 1st level	2nd level	Source: Source of assessment	Spatial level of source
B 5.1	Air pollutants													↘			↘	L	R	S	
B 5.2	Noise emissions													↘			↘	L	R	S	
B 5.3	Visual quality of the landscape													↗			↗	L	R	S	N
B 5.4	Land use													↗			↗	L	R	S	N
B 5.5	Climate																↘	L	R	S	
B 5.6	Renewable or non-renewable resources																↘	L	R	S	
B 5.I	**Overall impacts on social groups**																				
B 5.II	**Implementation phase**																				
B 5.III	**Operation phase**																				
B 5.IV	**Summary / comments concerning the main impacts**	- Reducing noise emissions at their source, through measures relating to vehicle propulsion, tyres, road surfaces and traffic management, is far more effective than end-of-pipe measures (like noise barriers). Moreover, e.g. through traffic management (optimising traffic flows), not only noise emissions can be reduced. Traffic management will also lead to several other (mostly positive) environmental impacts like reduced air pollution, less CO2 emissions and more economical driving behaviour (which leads to less petrol use). [4] - End-of-pipe measures to reduce noise (by increasing the distance between source and recipient or by hampering noise propagation by insulating buildings or constructing noise barriers) will lead to more land use and have a negative impact on the visual quality of the landscape. This will mostly count for residents near motorways or (busy) railroad tracks. [4]																		
B 5.V	**Quantification of impacts**	- A new speed limit on a few dutch motorways near cities (from 100 to 80 km/h) has had a positive effect on air quality, but noise emission has also been reduced by up to 1.5 dB(A). [9] - Studies have stated that a reduction of 8-10 dB(A) can be achieved if all tread-braked rail freight wagons are retrofitted with composite brakes [4]. - Night time restrictions on heavy vehicles can reduce up to 7 dB(A) at night time [4]. - A very effective way to reduce noise emissions is to simply reduce traffic. A 20 % reduction of traffic on a certain road will decrease noise emissions with 1.0 dB(A) [4].																		

C REFERENCES

C 1	**Other TPMs of this subcategory**	
C 2	**References**	**International** [1] European Commission (2011): Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system, Luxembourg: Publications Office of the European Union [3] World Health Organization (2010): Health and Environment in Europe: Progress Assessment, Copenhagen: WHO Regional Office for Europe [5] European Commission (2008): Rail noise abatement measures addressing the existing fleet, SEC(2008) 2203, Brussels [6] European Commission (2011): Proposal for a Regulation of the European Parliament and of the Council on the sound level of motor vehicles, SEC(2011) 1505 final, Brussels **National** [2] Centrum für Europäische Politik (2012): EU Regulation Sound Level of Motor Vehicles - Policy Brief, Freiburg: CEP [4] CE Delft (2007): Traffic noise reduction in Europe - Health effects, social costs and technical and policy options to reduce road and rail traffic noise, Delft: CE Delft publications [7] INFRAS/IWW (2004): External Costs of Transport, Update Study, Zürich/Karlsruhe: INFRAS/IWW [8] IPG (2007): Innovatieprogramma Geluid (Noise Innovation Programme (in Dutch)) [9] Dutch Ministry of Transport (2006): Evaluatie 80 km zones (Evaluation of 80-km zones (in Dutch), letter from the Minister of Transport to the Dutch parliament, DGP/WV/u