

# Railway Noise Control in Germany- a Success Story and an Example for Europe

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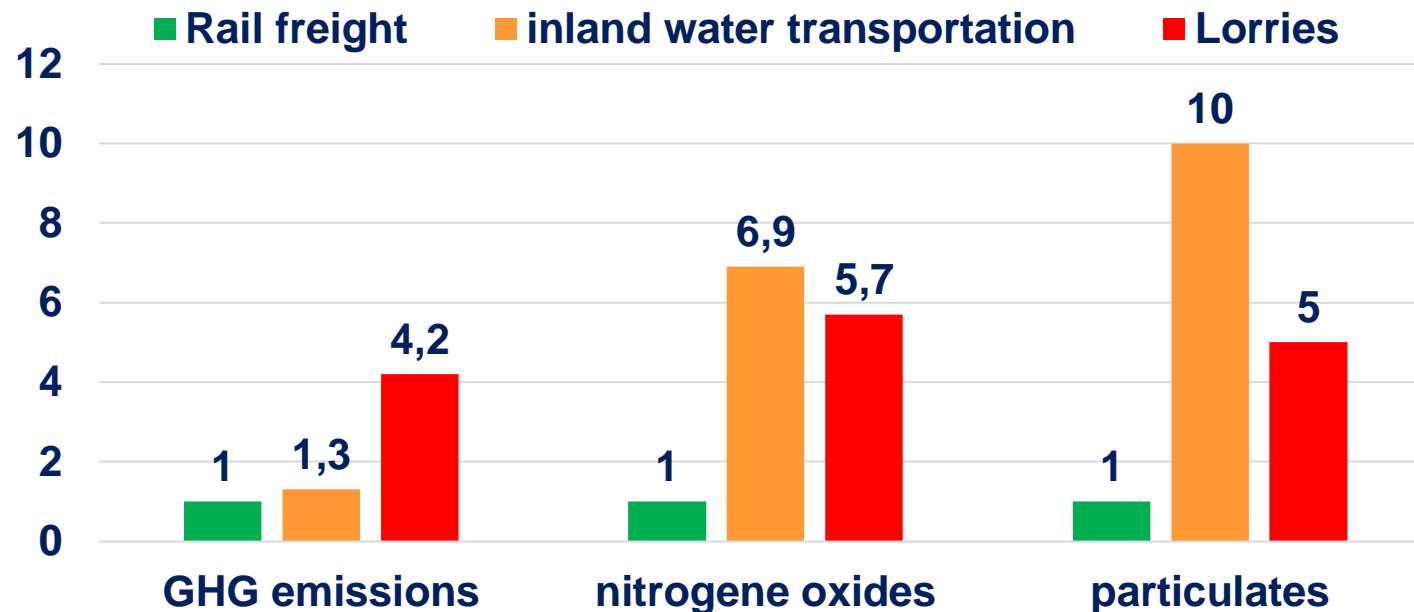
**Internoise 2016 - Satellite**  
**Berlin , 26.08.2016**

- **Sustainable Transport: shift to rail**
- **Main obstacle to shift: noise impairments and complaints**
- **German railway noise abatement strategy:**
  - **Precautionary acoustic planning** → new infrastructure
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  - **Retrofitting programme** → existing freight wagon fleet
- **European railway noise policy**
- **Conclusions: evaluations and recommendations**

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- In many aspects rail transportation the **most sustainable transport mode** (safety, climate protection, air quality, area consumption etc.)
- **Emissions (Germany, UBA 2016):**

Normalised specific emissions from freight transport means - Germany 2014



- Political **consensus**: shift to rail
- Modal share **targets** in freight transport:

Target	percentage	year	Source
Shift of lorry transportation > 300 km → rail, inland water transportation	30	2030	EU-Commission White Paper Transport 2011
	50	2050	
Modal share of rail	25 (in fact 17)	2015	German Government 2012

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# Main obstacle to shift: Noise impairments and complaints: Example middle Rhine valley

Max. levels in the middle Rhine valley:  $L_{eq,night}$  up to **81** dB(A),  $L_{max}$  up to **109** dB(A)



„Rail noise makes sick“

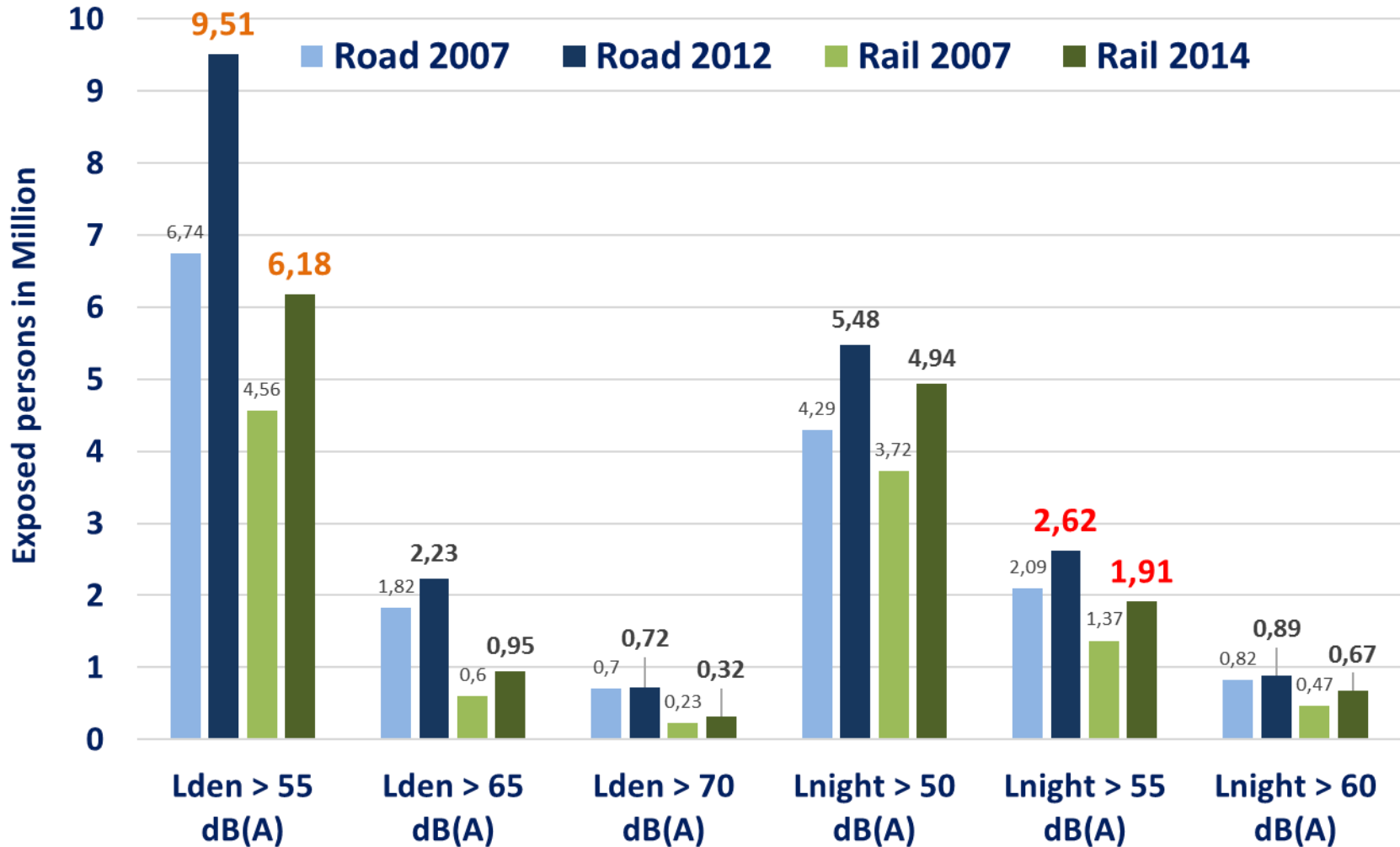
Demonstration on 07.05.11 in Rüdesheim,  
Rhine valley



„Nighttime ban for freight wagons“

Poster of citizens' initiative in the middle  
Rhine valley (27.02.2012, Bingen)

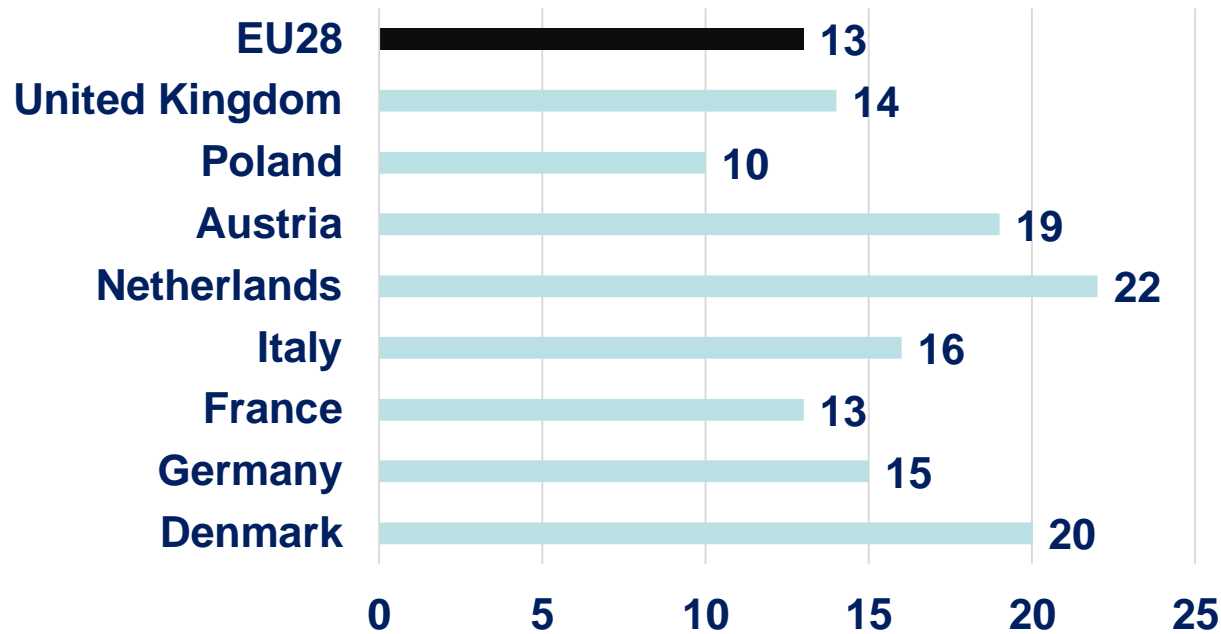
# Main obstacle: noise impairments – END results in Germany





- **1,91 Mio.** persons exposed to **health risks** (EU28: **5,38 Mio.**)  
(night levels above **55 dB(A)**)  
(road: 2,85 Mio. persons).
- **6,18 Mio.** persons **highly annoyed** (EU28: **15,2 Mio.**)  
( $L_{den} > 55$  dB(A))  
(road 10,2 Mio. Menschen).
- **Impacts at night** for road and rail in the same range,  
though transport performance of rail freight is  $\frac{1}{4}$  of the road  
performance  
→ **specific** (performance related) **impacts** for rail higher than for  
roads  
→ shift to rail – without measures - would **increase** the total  
impairments
- **Delays** in the construction of new railway tracks: example  
upgrading railway line Basel-Karlsruhe (Rheintalbahn) – section  
near Freiburg: plan approval decision delayed by about **12** years

## Disturbance by rail transport in percent of the population



Source: Eurobarometer 420 , Sept. 2014

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- Outdoor **noise reception limits** in force since 1990; residential areas:
  - Till 2014:  $L_{eq}$  of **64/54** dB(A) day/night
  - Since 2015:  $L_{eq}$  of **59/49** dB(A) day/night (elimination of the so called rail bonus)  
(Trams 2019)
- **Priority for active measures** (source, propagation) but in case of low efficiency **passive measures** (sound insulation windows) are applied
- Lines with level increase due to **operational changes** (speed, traffic volumes): No application of the reception levels
- **Conflicts:**
  - Opposition against **rail bonus** and **passive measures**
  - $L_{eq}$  as **indicator** criticised
  - Claims for the inclusion of **operational changes**
  - Opposition against rail freight lines **through towns** (and if: claim for **tunnels** instead of high barriers)

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- **Start** in 1999 (federal roads; 1978!)
- **Responsible:** German Ministry of Transport MoT, supported by the German railway agency EBA
- **Implementation:** DB Netz (Infrastructure)
- **Financing:** based on budget acts:  
1999: **51 Mio. €** → 2016: **150 Mio. €**
- **Measures:**
  - **Active :** Noise barriers, grinding, rail absorbers etc.
  - **Passive:** sound insulation windows



- **Threshold outdoor levels** for residential areas (no reception limits creating legal claims!)
  - 1999 to 2014:  $L_{eq} > 75/65$  dB(A) day/night
  - 2015:  $L_{eq} > 70/60$  dB(A) day/night (elimination of so called rail bonus)
  - 2016:  $L_{eq} > 67/57$  dB(A) day/night (corresponding to levels in the federal road remediation programme)
- **Results** (by the end of 2015):
  - Remediation for **1500** track-km finished (still remaining 2200 track-km with high exposures)
  - **610** km noise barriers
  - **55.300** apartments with sound insulation windows

- Competent authorities for major railways up to 2014 in most regions in Germany: **communities**
- First stage of noise action plans NAP (deadline 2008): besides land-use planning communities **not capable** of implementing measures
- since 2015 the **German railway agency** EBA in charge of the NAP for major railways
- EBA designed a **pilot NAP** in 2015 not complying with the END
  - No target levels
  - No concrete actions for specific local problems
- **Harmonisation** between the remediation programme and the NAP still missing
- For major railways END **did not yet contribute** to the noise abatement



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- **Freight wagons:** highest emissions, nighttime operation
  - Long lifetime (40 years): sound emission limits for **new** wagons (TSI Noise) **not sufficient**
- **retrofitting of the existing fleet:** substitution of the cast iron (CI) blocks –roughening the wheels - by composite blocks (K and LL)

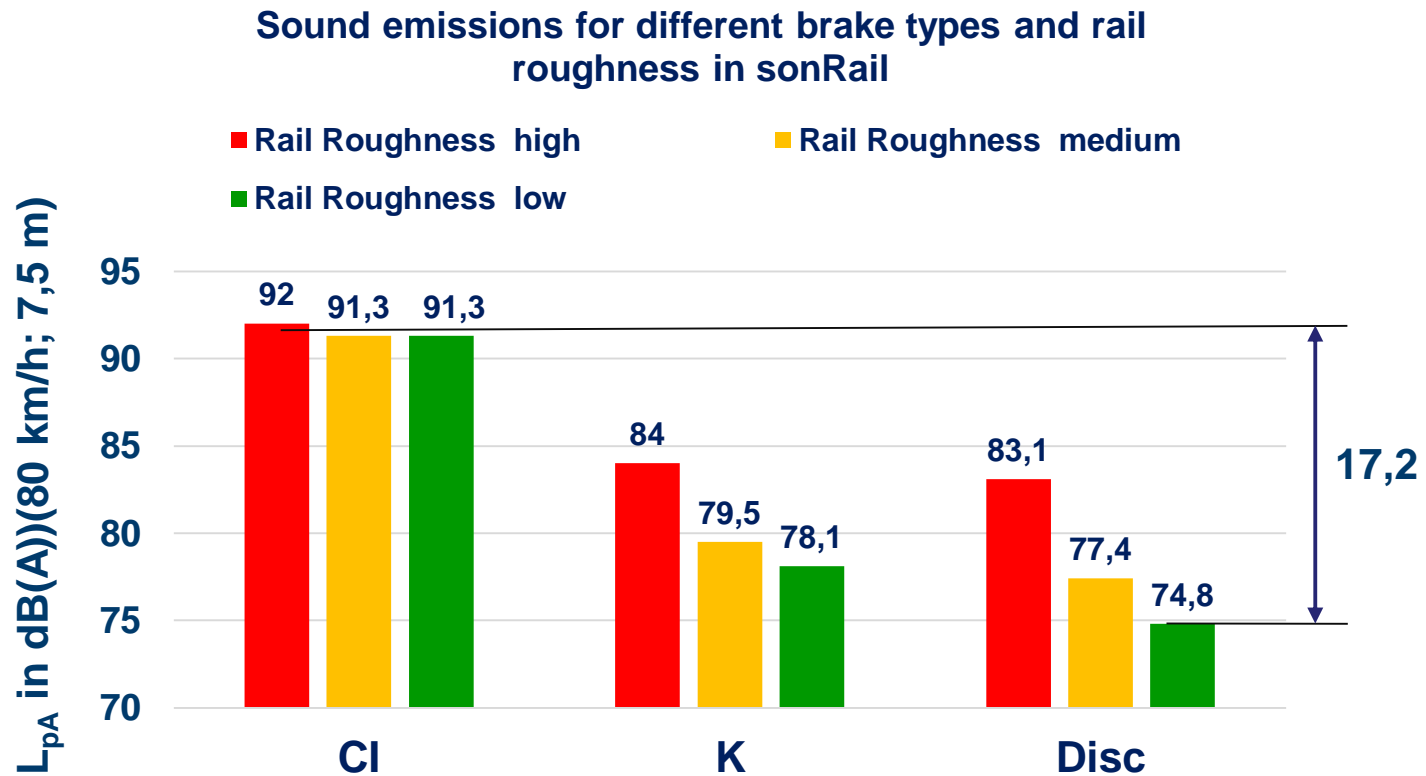


**K-blocks : Switzerland 2007**

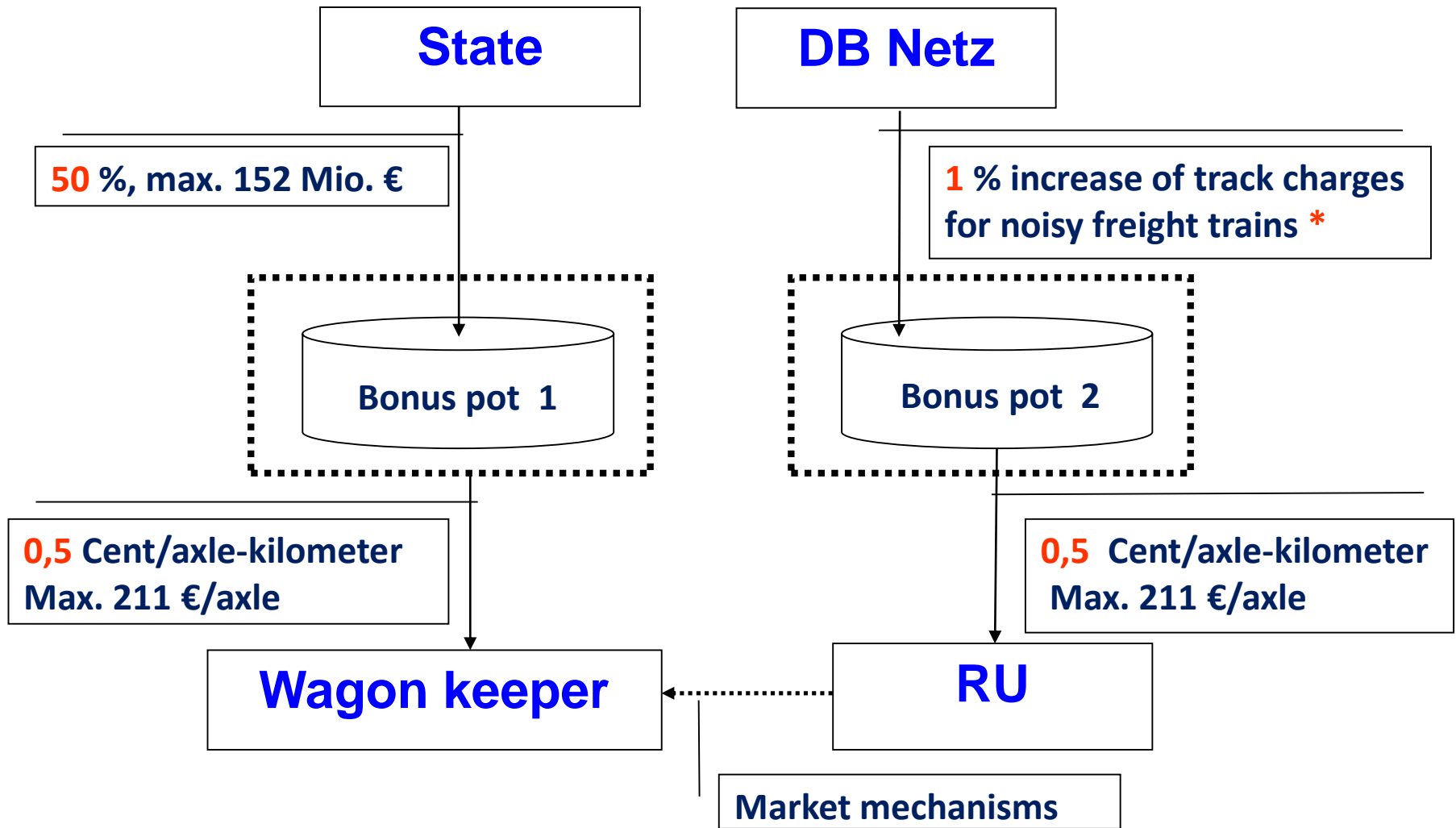


**LL-blocks. Labelling, DB 2013**

- **Reduction potential** as function of rail surface roughness (!)
  - **German** calculation scheme Schall 03;2015: **5 to 8 dB(A)**
  - **Swiss** calculation scheme sonRAil CH: **8 to 13 dB(A)**



- Based on an **agreement** between the German Ministry of Transport (MoT) and the Deutsche Bahn (Infrastructure) in 2011
- Start in **12/2012** , end: **31.12.2020**
- Two elements (see next slide):
  - **State subsidies** for retrofitting
  - Cost neutral noise differentiated track access charges **NDTAC**
  - **Open** for all railway undertakings RU and wagon keepers (WK) operating in Germany
  - **Financing** based on the investment costs for LL-brakes
- **Target:** By the end the programme no more CI-wagons operating in Germany (agreement of the current government coalition of 2013)
  - MoT prepares a **corrisponding act**
  - Main problem: not to violate the **European right of the free movements of goods**



\* 06/14 1,5%, 12/14 2%, 12/15 2,5%, 12/16 3,0%, noisy freight trains: > 20 % CI-wagons (> 10 % since 12/14)

- **National vehicle register:**
  - **172.476** wagons
  - Wagons with composite blocks by 18.05.2016: **38.532** ( $\equiv$  22,3 %)
- **Retrofitting register:** about **166.000** registrations from 39 companies in 8 countries (April 2016)
- **Low-noise freight trains:** **16 %** of the track-kilometers (2015)
- **Commitment** of two major wagon keeping groups to comply with the 2020 target (representing about 2/3 of the wagons operating in Germany)
  - **DB Schenker Rail** (60.000 wagons): End of 2016 **32.000** low-noise wagons
  - **VPI** : association of private wagon owners (60.000 wagons): End of 2016 **30.655** low-noise wagons
- MoT plans **15 monitoring stations** to prove the retrofitting and procurement progress

- German MoT plans a **scrapping bonus** („Innovationspraemie TSI+“):
  - Scrapping of an old noisy wagen
  - combined with the **acquisition** of new wagons with emissions **below the TSI Noise limits**
  - will be funded by the state
  - Currently MoT designs the **funding guidelines**

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- EU made **important contributions** to the reduction of railway noise
  - Introduction of **sound emission limits** in 2002 (**new** high speed trains) and 2005 (**new** conventional vehicles), (compare: road vehicles 1970!): de facto ban of new CI-wagons
  - **Merged** within the TSI Noise of 2014, slight reduction of limits (except for freight wagons)
  - Introduction of **voluntary Noise Differentiated Track Access Charges** NDTAC in 2012 (Commission had preferred a mandatory introduction)
  - **Implementing Regulation** (EU) 2015/429 on optional introduction of noise-differentiated track access charges (NDTAC) (harmonizing NDTAC schemes)
  - **Introduction of funding** the retrofitting of CI-wagons (within the Connecting Europe Facility 2014: 20 % of the investment costs)

- Most recently : European Commission's **Staff Working Document** (SWD(2015) on the effective reduction of rail freight noise  
(Originally a **Communication** was planned)
- Most important **proposal**:  
Application of the TSI Noise limits to **existing freight vehicles**  
(without defining the date of the entry-into-force; planned Communication 2022 for internationally operating freight wagons, 2026 for all freight wagons)
- Currently a **Task Force** of the European Railway Agency ERA develops the necessary TSI Noise revision.

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## Evaluation of the German railway noise policy

- Much **progress** has been achieved:
  - Elimination of the **rail bonus**
  - Improvements in the **remediation programme** (lower thresholds, considerable increase of the financial volume)
  - Currently planning of **new and upgraded lines** with protection levels beyond legal requirements (Rheintalbahn)
  - **Retrofitting programme**: Complete elimination of national CI wagons by 2020 is realistic
- **Deficits, remaining problems**
  - **Remediation threshold levels** have been too high and **passive measures** too often applied to create acceptable situations (middle Rhine valley)
  - Retrofitting of **foreign wagons** by 2020 not ensured
  - **NDTAC** limited to the retrofitting of freight wagons
  - Reduction of the **track emissions** still at discretion of DB Netz

## Evaluation of the European railway noise policy

- Progress
  - Introduction of **sound emission limits**
  - **CEF funding** for retrofitting
  - **NDTAC** guidelines and harmonisation
  - Considering **bans** for CI wagons
- **Deficits, remaining problems:**
  - Emission limits do not activate the current **reduction potential**
  - **CEF funding:** still unclear if in addition to national funding
  - **NDTAC not mandatory**, introduction only in Germany and the Netherlands (and Switzerland)
  - **Bans:** entry-into-force still unclear and possibly too late

## Recommendations - German policy:

- **Updating of the remediation programme** – solving the problem of different protection levels; harmonisation with noise action planning
- Activation of the full reduction potential of **NDTAC** (locomotives, low emission railbound vehicles)
- Better regulation of **track quality** (improved grinding schemes)
- Legal improvement of the **precautionary acoustic planning**: legalise the new approaches (i. e. Rheintalbahn)

## Recommendations- European policy:

- **European ban of CI wagons** the most effective instrument and better than national regulations: it should be introduced as soon as possible
  - Other **member states** should follow the German retrofitting example (better European support?)
  - **Economic aspects:** retrofitting a financial burden for the railway sector (increased operating costs, limited funding)
- Strengthening the railway competitiveness by **internalising the external costs** for all transport modes
- Creation of an **innovative rail freight transport system** with low emissions and energy consumption and high productivity (full interoperability, improved logistics)
  - Activation of the potentials of **traffic avoidance**



**Thank you for your attention!**

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