European tyre and Rim
Technical Organization

Cost-Benefit Analysis by EMISIA

September 9th 2022

EMISIA - CBA

- An essential part of the EMISIA study is the cost-benefit analysis for different scenarios that were set up by the EMISIA partners.

- The study identifies the highest achievable benefit for the scenarios in which the tyre noise is reduced as well as all scenarios that are combined with this.

From this figure it can be seen that **quieter tyres are very effective to reduce the health burden by 12-19%**, which is the main quantity considered here. This single scenario also has a high benefit-to-cost ratio, as the costs of quieter tyres are limited compared to powertrain noise reduction.

Scenario	ΔLden		ΔLnight	
	Urban	Non-urban	Urban	Non-urban
0. Baseline	-	-	-	-
A. Available limit space	-0.3	-0.1	-0.3	-0.1
B. Targeted tightening	-0.4	-0.1	-0.5	-0.2
C. 75 dB(A) cap	-0.3	-0.1	-0.4	-0.1
D. L_{WOT} limit	-0.2	-0.1	-0.3	-0.1
E. Improved test	-0.5	-0.1	-0.5	-0.2
F. Quieter tyres - 3dB	-1.5	-1.9	-1.5	-1.9

- The following slides focus on:
  - **The justification for the assumption of a possible 3 dB limit reduction**
  - **The time wise implementation within the simulated scenario for quieter tyres**

Cost benefit analysis

Scenarios –Specification of alternative scenarios

- *Assessment of most common and popular tyres on the market, shows that currently about 10 – 20% already have an A-label (M1), meaning that they are already 3 dB or more below the Stage 2 limit value.*
- *A recent Swiss study also considers 3.5 dB reduction as a realistic scenario. The number of tyres with a noise level of 4 dB (or more) below this limit is very limited.*

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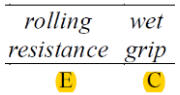
- The mentioned Swiss study is: "**The noise reduction potential of "silent tyres" on common road surfaces - Emanuel Hammer**" from 2018
- EMISIA reports that the study claims a 3,5 dB noise reduction potential.

> predicted. Thereby, a mean noise reduction potential for all tyre's width is estimated at about 1.5 dB according to Sect. 3.2. If the future

- The swiss study identifies **less then half** the amount of potential noise reduction for tyres then what is reported by EMISIA.
- Further, this 1,5 dB reduction potential is only valid because of **ONE** (outlier) tyre that was measured extremely quiet, was used in the averaging, with the following label:



- Without this outlier the identified reduction potential (by the Swiss study) would be closer to only 1 dB.

- Overall, the Swiss study identifies a much lower potential for the tyre then what EMISIA reported, even supporting the ETRTO and ACEA TPS regarding the target conflict between noise and RR:

> Furthermore, the study revealed that the main influencing parameters defining the rolling noise emission on the tyre side are: tyre width and tyre radius, rubber hardness and the EU label for rolling resistance yielding in a high coefficient of determination.

2. – Implementation timeline of scenario F

- The EMISIA study analyzed a time frame of 25 years, from 2020 to 2045.

- *Therefore, 3 dB tighter tyre noise limits for all three tyre label categories are used as a possible scenario to identify the possibilities and effects of such a noise reduction measure,* ***starting in 2022****.*

- *With the average lifetime of a tyre between 3 – 4 years, this reduction should be fully implemented in 2026.*

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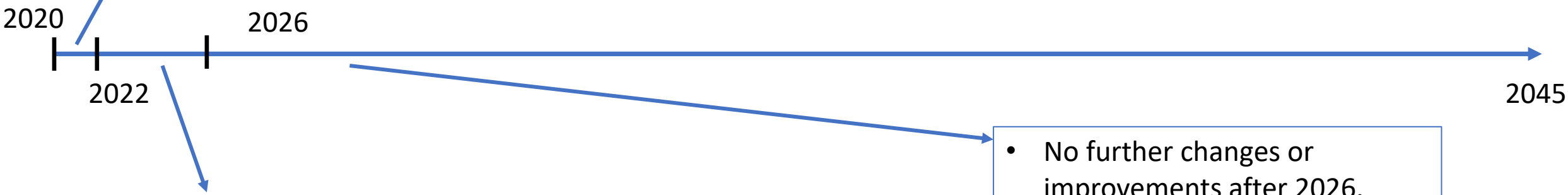
The timing designed by EMISIA would mean that:

- Within two years tyre industry redevelops around 91 % of all articles on the market (including C2 and C3) to become A-label tyres in noise without compromising other performances.
- ➢ **91% of the market is redeveloped, all existing molds are replaced, the new tyres are tested, successfully homologated without further development loops and introduced to the market within two years.**

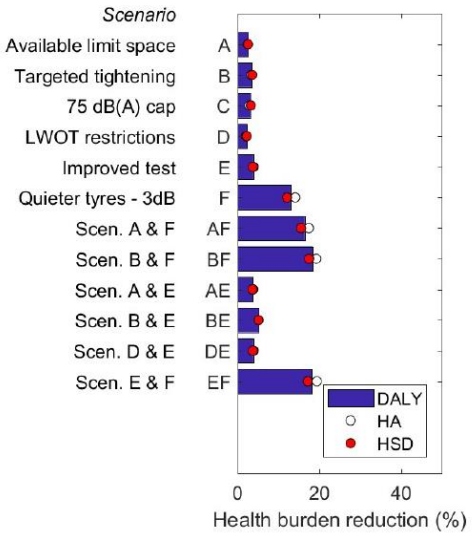


- After 2022 only the redeveloped -3 dB tyres are sold. All old products are no longer available on the market to achieve the full implementation of the EMISIA “scenario F” in 2026.

- No further changes or improvements after 2026.

- **For ETRTO this timeline is unrealistic and one of the main reasons why the scenario on quieter tyres shows such a high benefit in the EMISIA study.**

EMISIA – CBA -> No differentiation for unrealistic scenarios



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- **As far as ETRTO is aware, EMISIA does not give any indication for the level of realism regarding the used scenarios.**
- **All scenarios are presented as equal both in text and in the presented graphs.**
- **This might be misleading for readers trying to assess and to qualify the reported benefits for traffic noise.**

Thank you very much for your attention.