EUROPEAN TYRE & RUBBER manufacturers' association

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LOW-EMISSION MOBILITY
Focus on Freight Transport

ETRMA[1] Position

Executive Summary

- Tyres are an important enabler of sustainable mobility: tyres are the only point of contact between the vehicle and the road and this is no larger than the surface of a postcard for a passenger car or an A4 sheet for truck tyres. Mainly because of their rolling resistance, tyres account for up to 30% (when they are properly inflated and maintained) of the fuel consumption of vehicles;
- The EU tyre market is today the most technologically advanced in the world and tyres are the most stringently regulated part on the vehicle in the EU;
- The European tyre industry has been supporting the EU institutions in setting minimum requirements for specific tyres performances, which have an impact on vehicles' overall CO_2 emissions, noise and safety. Such performances have also been the object of the tyre labelling regulation, which provides useful information to the consumer;
- Improving efficiency in reducing CO_2 emissions and road safety: choosing the right tyre can impact fuel consumption, it affects a vehicle's performance in terms of road safety and noise production. Options are available on the market that will meet requirements at all levels and that will follow furthertechnolgical improvements. Other aspects contributing to reducing CO2 emissions are the material composition of the tyre (e.g. for low rolling resistance tyres), tyre dimensions (standard or single wide tyres) and the use of a tyre pressure monitoring system (for optimized tyre pressure).

The EU tyre industry has since long time **taken a proactive approach** and **is engaged in reducing CO2 emissions** through new and advanced tyre technologies whilst promoting road safety and other regulatory measures, such as the tyre label; it **supports** the EC initiative to reduce Heavy Duty Vehicle (HDV) **CO_2 emissions and foresees reducing on average tyre rolling resistance coefficient[2] by 1% per annum**.
Furthermore, the sector **stresses** the need to extend **the mandatory fitment of TPMS to HDV and requests effective and harmonized enforcement** of existing and future tyre regulations.

[1] **ETRMA** represents 11 tyre manufacturers ((Bridgestone Europe, Michelin, Goodyear Dunlop Europe, Continental, Pirelli, Hankook, Cooper Tires, Nokian Tyres, Apollo Vredestein, Marangoni, Trellborg Wheel Systems) active in Europe with 91 production facilities in 21 member states and 18 research centres.

[2] **Rolling resistance** can be expressed with the rolling resistance coefficient (RRC), which is the value of the rolling resistance force divided by the wheel load. A lower coefficient means the tyres will use less energy to travel a certain distance. This cannot be just lowered as for instance safety aspects are also to be considered. Rolling resistance (RR) is just one of several antagonistic performances required for a tyre at the same time as grip, safety/endurance, noise, road handling or braking. When efforts are taken to improve tyre RR the effects on other parameters have to be considered in order to not compromise on safety. This means that changing one performance has a direct effect on the others. Therefore, no one tyre characteristic should be regulated in isolation from the others, a principle that the European legislator has also embraced (EC/1222/2009 and EC/661/2009).

What has been the contribution of the tyre sector to reduce transport CO_2 emissions so far?

A technologically ambitious industry enabling new regulations on sustainable mobility.
Since the 1990s, European tyre manufacturers have developed technologies lowering fuel consumption and CO_2 emissions by **introducing Low Rolling Resistance Tyres (LRRT)**[3]. On this basis, and carefully balancing these developments with parallel ones regarding rolling noise and wet grip, the industry started a dialogue with the EU institutions to see how to regulate these performances, along with achieving a better level of information for consumers.
This work resulted in the following regulations:

- Tyre environmental and safety performances thresholds have been included in the General Safety Regulation (regulation (EC) 661/2009): this imposes rolling resistance (which impacts CO_2 emissions) limits, along with wet grip and rolling noise thresholds to type-approve tyres for the EU market. This regulation covers tyres for passenger, light and heavy duty vehicles
- Tyre labelling has also been made mandatory through regulation (EC) 1222/2009: since 2012, labels show consumers the level of rolling resistance, wet grip and rolling noise.

What can the tyre industry and regulators do to further contribute to the EU low emission mobility agenda?

The tyre industry is willing to continue playing an active role in CO_2 emissions reduction, but this needs to go hand in hand with a full deployment of existing solutions whose application would allow to benefit fully from the best tyre technologies.

- **Our ambition for 2030:**

With the current state of technology and so much advanced requirements on tyres, the tyre industry is committed to provide the consumers with the best performing tyres on all the essential performances, some of which are strictly regulated.. Therefore, industry continues investing in advanced materials and technologies **to further contribute to the European climate goals and foresees to reduce the rolling resistance coefficient of truck tyres by 1% per year until 2030.** If the **road transport were to stay constant**, this would lead to a **reduction of 8.7 million tons of CO2** due to tyres. However taking into account the forecasted increase by 18% of road transport, this **will still result in an overall reduction of 0,5 million tons of CO_2**[4] due to tyres**.** This commitment is reflected in the tyre industry contribution to a successful design and implementation of VECTO[5].

- **Tyre Pressure Monitoring System (TMPS) on all vehicle categories:**

TPMS is necessary to ensure that tyre pressure is optimal in order to fully benefit from the contribution of low rolling resistance tyres to the vehicle's CO2 emissions reduction and lower fuel consumption.
Regulation 661/2009 requests that all new passenger cars sold after November 2014 are equipped with TPMS. For Commercial Vehicles, this is not yet the case. A TPMS fitment as of 2020 will need to be mandatory to support the driver in ensuring that his tyres are in optimal service conditions and draw the full potential of low rolling resistance tyre-technology. Otherwise the benefits will be **partly** lost.

- **Encourage market uptake and increase driver awareness**

The market uptake for LRRTs still shows ample margins of improvements, on the replacement market. This can be attributed to:

- economic factors (on average the price of LRRTs is higher and there is lack of economic incentives to buy them),
- poor consumers' awareness about the benefits of using LRRTs,
- poor tyre service life conditions.

[3] **LRRT** minimize wasted energy as a tyre rolls, thereby decreasing required rolling effort — and in the case of automotive applications, improving vehicle fuel efficiency. Rolling resistance on the vehicle depends amongst others on tyre design, manufacturing process, road surface, optimal tyre pressure maintenance, load to carry, tread depth.

[4] See Annex 1 for further details

[5] **VECTO** is the Vehicle Energy consumption Calculation Tool that calculates fuel consumption and Co2 emissions from the whole vehicle

Awareness campaign(s) should be conducted to increase drivers' knowledge of the labelling scheme. The campaigns could be run at national level by Member State Authorities, at EU level by the Commission or both. Awareness campaigns should also provide incentives for industry to innovate even better performing tyres and for dealers to promote the label more efficiently.

In addition, Member States should be encouraged to ensure that their Central Governments as well as local authorities are aware of the requirement to purchase tyres in the highest fuel efficiency and safety class and to include these aspects in their tenders for service contracts in accordance with the requirements in tyre label regulation as well as in Annex III of the Energy Efficiency Directive[6].

Furthermore, EU and national authorities should support tyre education campaigns, and also ensure that knowledge on fundamental tyre aspects is part of the driving license curricula.

- **Market surveillance and enforcement:**

With regards to enforcement and market surveillance, the industry has long identified the need to carry out such activities in a more regular fashion and in a harmonized manner across the EU. With rogue players entering the European market without respecting its rules, only effective enforcement and market surveillance can ensure the respect of EU tyre legislations. And only the respect of such laws can bring about the attainment of their objectives and the eventual reduction of transport emissions.

Conclusion

The European tyre industry has contributed significantly to the EU objectives of reducing CO_2 emissions.
This has been done through high investments in research and development focusing on reduction of tyre rolling resistance, its balance with other tyre performances and without compromising on safety.
In this context and on the basis of the Commission proposed strategy, ETRMA believes it possible to contribute to the reduction of CO2 emissions from the transport sector through the following actions:

- make the installation of TPMS on HDVs mandatory by 2020;
- implement proper market surveillance to check the compliance of products on the European market with current and future EU legislation – otherwise meeting the 2050 targets will be undermined and the market will be skewed in favor of non-compliant operators[7];
- consider GHG emissions in the context of other EU policies, e.g. Road Safety, Circular Economy, Sharing Economy, EU Investments plan and Better Regulation Guidelines.
- significant fuel efficiency and road safety can only be achieved through an integrated approach involving all the concerned stakeholders: Tyres / Roads / Vehicles / Drivers' behavior
- **ETRMA members will continue improving tyre rolling resistance by reducing on average tyre rolling resistance coefficient[8] for Heavy Duty Vehicles by 1% per annum. This will result in CO2 saving of 8.7 million tons which corresponds to removing every year 81,000 40-ton trucks from the European roads.**

[6] Viegand Maagoe Final report -review study on the 1222/2009 on the labelling of tyres, March 2016

[7] A survey of the DG Environment shows a cost of € 50 bn from non-compliance: *The costs of not implementing the environmental acquis. European Commission Directorate-General Environment. September 2011.*

[8] **Rolling resistance** can be expressed with the rolling resistance coefficient (RRC), which is the value of the rolling resistance force divided by the wheel load. A lower coefficient means the tyres will use less energy to travel a certain distance. This cannot be just lowered as for instance safety aspects are also to be considered. Rolling resistance (RR) is just one of several antagonistic performances required for a tyre at the same time as grip, safety/endurance, noise, road handling or braking. When efforts are taken to improve tyre RR the effects on other parameters have to be considered in order to not compromise on safety. This means that changing one performance has a direct effect on the others. Therefore, no one tyre characteristic should be regulated in isolation from the others, a principle that the European legislator has also embraced (EC/1222/2009 and EC/661/2009).

TECHNICAL ANNEX

REDUCING THE ROLLING RESISTANCE COEFFICIENT

Determination of CO2 emission and Road Transportation increase:

CO2 emission Road freight HDV:

Mt CO2 eq	1990	2000	2005	2010	2015	2020	2025	2030
EU 28 total CO2 emissions	5670.8	5215.6	5321.9	4846.8	4626.1	4296.7	4142.4	3843.9
Transport %				28%	28%	28%	28%	28%
Transport				1341	1283	1194	1153	1073
Road Transport				956	914	851	822	765
Road freight HDV				227	217	202	195	182

Source EU28 CO2 emission: EU ENERGY, TRANSPORT AND GHG EMISSIONS – TRENDS TO 2050 - REFERENCE SCENARIO 2013, annex 2 page 90.

Road freight HDV CO2 emissions:

Source: Institut Français du Pétrole – Energies Nouvelles "Panorama 2015 – Le point sur Les émissions de gaz à effet de serre du secteur du transport routier : en route pour une inclusion dans le système européen des quotas de CO2 ?":

2010 CO2 emission LDV 729 MtCO2e / HDV 227 MtCO2e: Total for Road Transportation **956** Mt.
Percentage of HDV emission = 227/956 = 23.7%. CO2 emission HDV: **227** Mte

Source : Impact assessment for White Paper SEC(2011) 359 final: In 2008, the proportion of road transportation within all transport modes was 71.3 %. That gives for all transport CO2 emission of 956 / 0.713 = **1341** Mte.

Applying the same trends to 2015: Road freight HDV CO2 emission = **217** Mte.

Increase of Road transport:

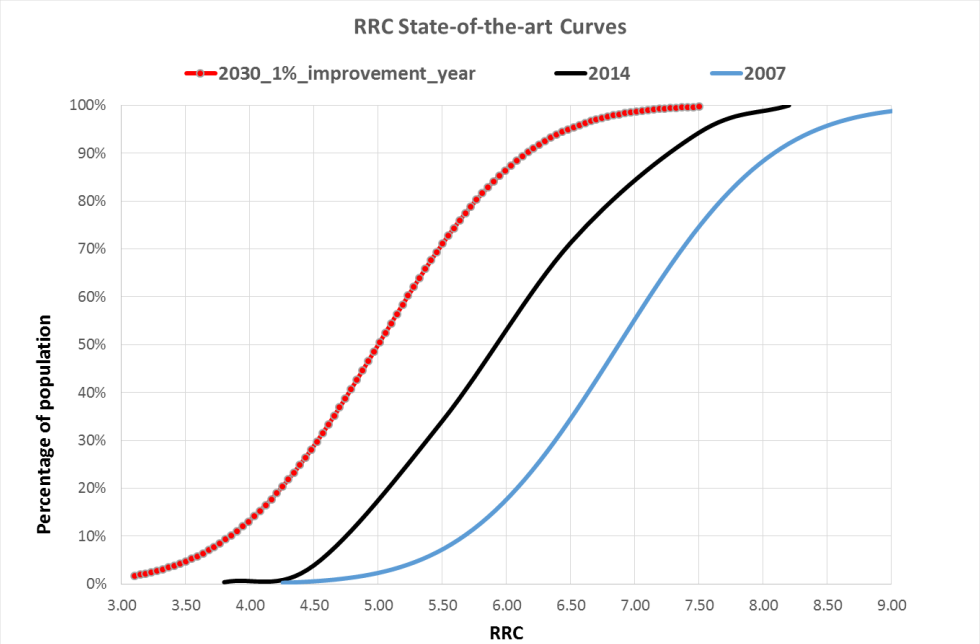
EU Transport GHG 2050: Routes to 2050? Annex to Task 3 Paper on the EU transport demand: Freight trends and forecasts.

- Freight transportation volume EU27 in 2005: 1711 Gt.km
- Prediction for 2050: 2812 Gt.km
- Assessing a constant increase rate per annum, EU 27 road freight transportation will increase by **18%** between 2015 and 2030.

CO2 reduction 2030 vs. 2015 due to tyres, considering 18% increased road transport:

HDV CO2 emission 2015:	**217** Mte
Increase HDV CO2 emission 2030:	18%
Estimated tyre RRC contribution to vehicle CO2 emission:	25%
RRC avg. 2015:	5.95 kg/t
RRC avg. 2030, assuming 1% improvement /year:	5.00 kg/t
CO2 reduction 2030: 217 Mte x 0.25 x (1 – 5.00/5.95 x 1.18):	**0.5 Mte**

The chart here-below illustrates the evolution of commercial vehicle tyres RRC over the period 2007 (industry data), 2014 (public tyre Label database) to the envisioned 2030 distribution.
When discussing the chart, it has to be noted that there is a physical limit in tyre RRC, making it more and more challenging to achieve further improvements in tyre rolling resistance. This is especially true for tyres that need to provide traction, among them winter tyres with an increasing demand triggered by national regulations:



A CO2 saving of 8.7 million tons corresponds to removing every year 81,000 heavy duty 40 ton trucks from the road[9]

GLOSSARY

Rolling resistance (RR) *of tyres is measured on Laboratory drum machines. The applicable test procedure to generate RR data for the purpose of tyre homologation and labelling is ISO 28580.*

RR force Fr: *Loss of energy or energy consumed per unit of distance travelled [N]. It can be measured by the methods as defined in ISO 28580 (force, torque, deceleration or power method). These methods are commonly used in tyre industry as well as by Testing Services and give equivalent results.*

Rolling resistance coefficient RRC: *Ratio of Fr to the load on the tyre [kg/t] or [N/kN]. A lower RRC means that the tyre will consume less energy and will be beneficial for the fuel consumption of a vehicle.*

Laboratory alignment: *Different RR test machines will generate slightly different results even when measuring the identical tyre. In order to compensate that effect and to make results comparable an alignment of machines is mandatory. In the EC this alignment is done vs. a virtual Reference Laboratory. The results of individual machines are aligned by a linear regression to the Reference Laboratory. The alignment has to be confirmed on a regular basis.*

Low rolling resistance (LRR) tyres *minimize wasted energy as a tyre rolls and improve vehicle fuel efficiency. The RR of tyres depends amongst others optimal tyre pressure maintenance, tyre design, manufacturing process, load to carry or tread depth, road surface etc. Currently there is no clear definition of LRR.*

Tyre performance integrated approach (TPIA): *RR is one of several antagonistic performances required for a tyre at the same time, such as grip, safety/endurance, noise, road handling or braking. When efforts are taken to improve tyre RR the effects on other parameters have to be considered in order to not compromise on safety. RR cannot just endlessly be lowered, meaning that future improvements in RR will require more and more efforts.*

[9] assuming avg. fuel consumption of 34 l/100 km and an avg. yearly mileage of 120,000 km