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Russian Federation

Informal document No. GRB-49-11  
(49th GRB, 16-18 February 2009,  
agenda item 6.)

# **Amendment to Regulation No.117, Concerning Manufacturer's Information about Tyre Rolling Resistance Coefficients.**

RF experts - 15/02/2009

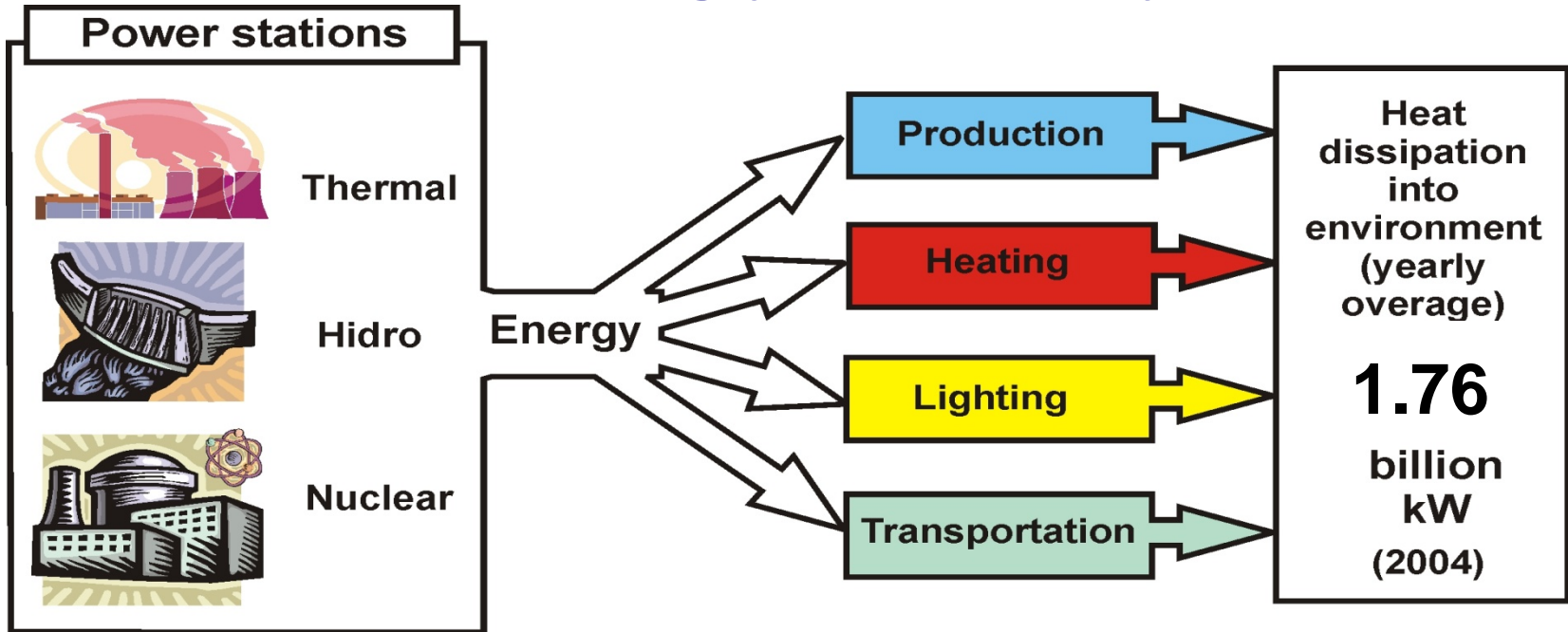
## The WP.29 146-th session resolution concerning the amendment to the Regulation #117 reads:




"33. The GRRF Chairman, Mr. Yarnold (United Kingdom), informed WP.29 about the results achieved by GRRF during its sixty-fourth session (for more details, see the report of the session ECE/TRANS/WP.29/GRRF/64).

34. He reported that GRRF had considered in detail the possible insertion of the provisions for rolling resistance either into Regulations Nos. 30 and 54, or into Regulation No. 117. **As rolling resistance is mainly an environmental issue linked to fuel efficiency, GRRF had finally agreed to insert these provisions into Regulation No. 117 and that GRB should resume consideration of this subject at its next session in February 2009 on the basis of a revised proposal. WP.29 endorsed that decision by GRRF.**"

Document under consideration is of world-wide socio-ecological importance because tyre heat dissipation and emissions are out of the control in world scale at present time.

# The warm effects of rolling tyres and industry are comparable



Tyre type	World fleet [billion]	R. R. power at 36 km/h [billion kW]	Heat dissipation into environment <b>1.60 billion kW</b>
 Cars $c_r=0.009$	<b>2.5</b>	<b>0.68</b>	
 Light trucks and buses $c_r=0.007$	<b>0.9</b>	<b>0.32</b>	
 Commercial whicles $c_r=0.005$	<b>0.5</b>	<b>0.63</b>	

## Calculation of energy dissipation:

The annual world motor gasoline consumption reported by US Energy Information Administration (2003) :

$V=20410,8 \cdot 10^3$  barrels per day  $\approx 924$  millions tons/year

Low calorific value:  $H=44000$  kJ/kg

The average generated power of the gasoline vehicle fleet :

$$N = \frac{924 \cdot 10^9 \text{ kg} \cdot 44 \cdot 10^6 \text{ J/kg}}{365 \cdot 24 \cdot 3600 \text{ s}} \cong 1,3 \cdot 10^9 \text{ kW}$$

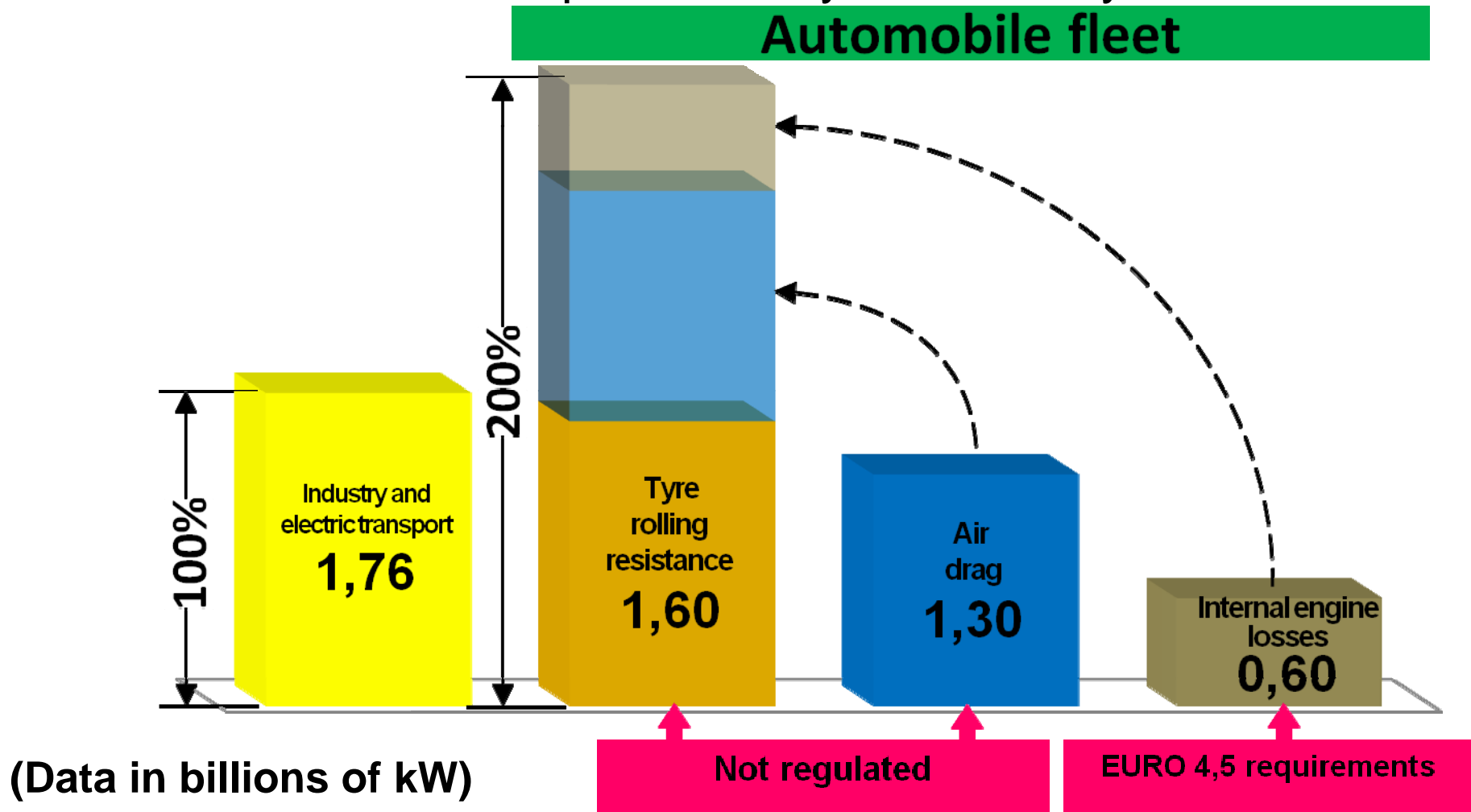
And taking into account the diesel fuel (expert evaluation coef. 1,55):

$$N = 1,3 \cdot 1,55 \cdot 10^9 \text{ kW} = 2,02 \cdot 10^9 \text{ kW}$$

RR heat dissipation (50% of N):

$$N_{RR} = 1,66 \cdot 10^9 \text{ kW}$$

The heat generated by rolling tyres is comparable with all the heat produced by the industry.



**The main uniqueness of the situation in this field is unbalanced requirements for energy parameters of automotive tyres and engines**

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**World vehicle fleet  
presented as a  
5-row pack**



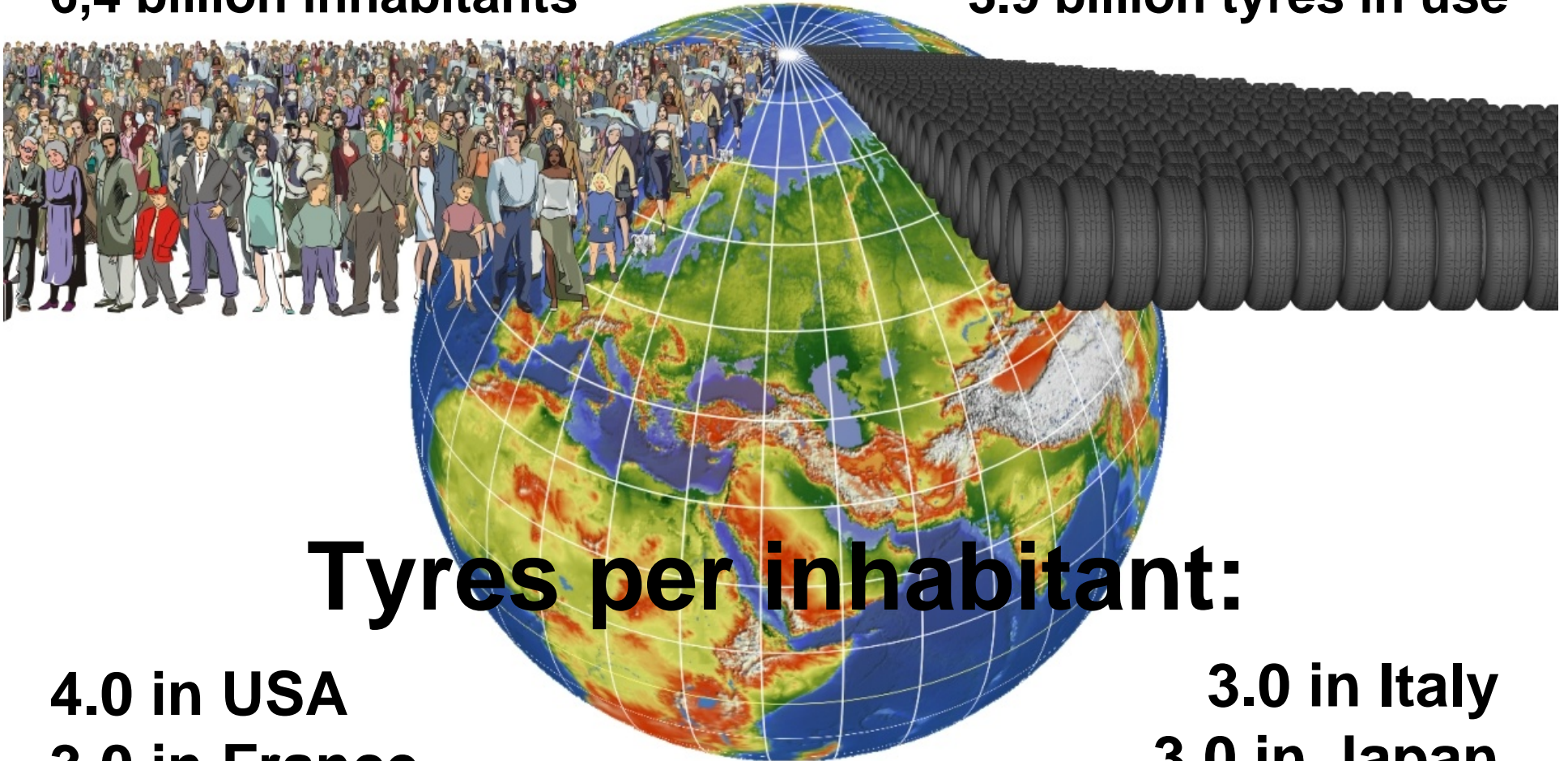
**would be 1.1 mln. km  
long (3 times the distance  
from the Earth to the Moon).**



# At present the planet has:

**6,4 billion inhabitants**

**3.9 billion tyres in use**



## Tyres per inhabitant:

**4.0 in USA**

**3.0 in France**

**3.0 in Germany**

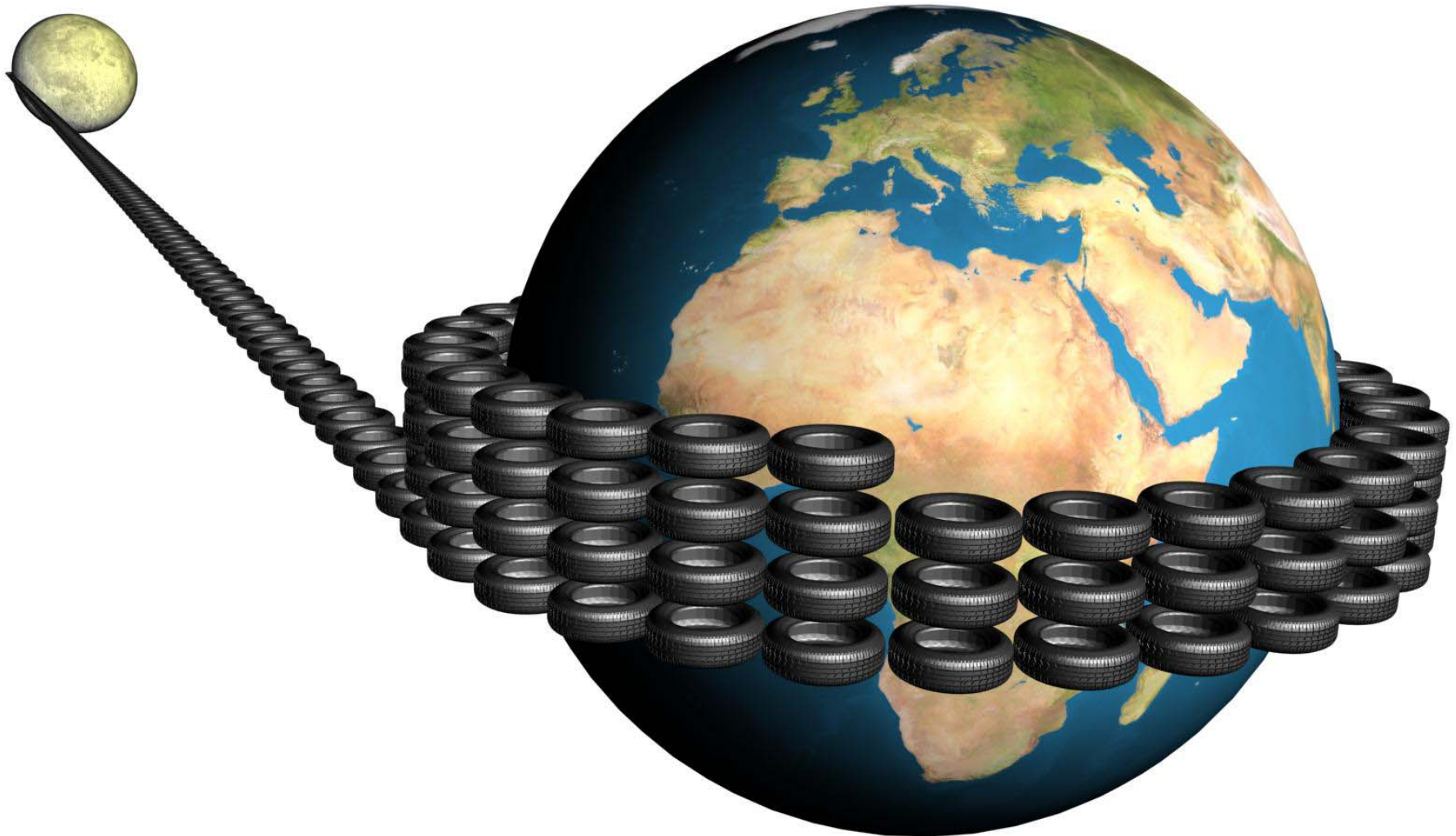
**3.0 in Italy**

**3.0 in Japan**

**0.6 in the World**



**3.9 billions of tyres used in the World  
can make a 2.67 million km long chain.**



**It would be 7 times longer than the distance between the Earth and the  
Moon or 66 times longer than the length of the equator**

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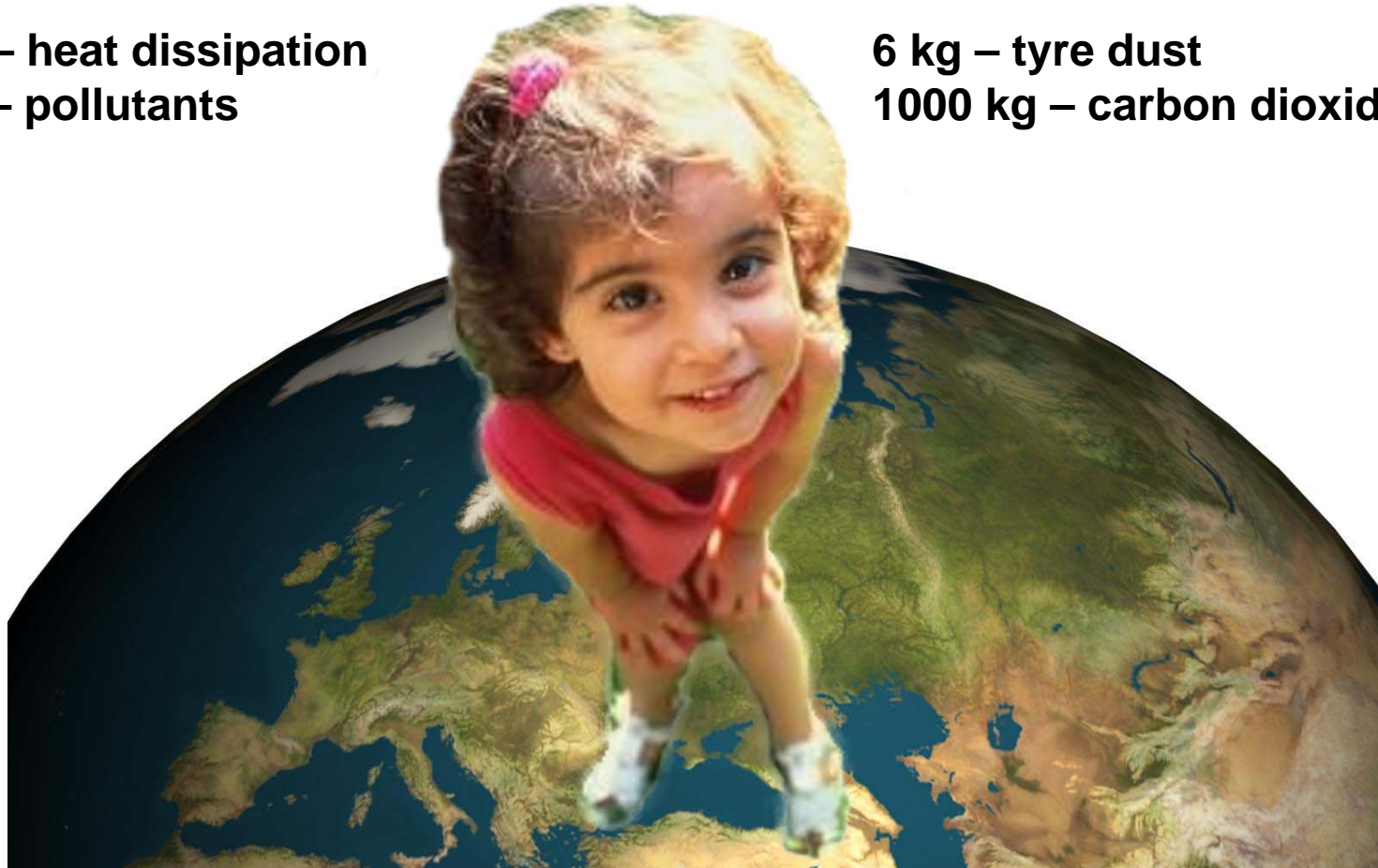
**Tire rolling resistance is a highly unusual object of GRRF examination.**  
Being equal to the productive industry in power consumption it generates

**only negative effects**

**Annually per each inhabitant of developed countries it results in up to:**

**1.5 kW – heat dissipation  
750 kg – pollutants**

**6 kg – tyre dust  
1000 kg – carbon dioxide (CO<sub>2</sub>)**



**Standardization of the tyre rolling resistance is urgent.**  
**The manufacturers' rolling resistance declarations are the first step.** 9  
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AMENDMENT TO REGULATION No. 117  
REGARDING MANUFACTURER'S INFORMATION  
ON ROLLING RESISTANCE COEFFICIENT

3. APPLICATION FOR APPROVAL

3.1. The application for approval of a type of tyre with regard to this Regulation shall be submitted by the tyre manufacturer or by his duly accredited representative. It shall specify:

.....

New paragraph:

"3.1.11 A value of rolling resistance coefficient determined according to ISO 28580 for the tyre of representative size with a list of designated range of tyre sizes and tread patterns covered by representative data."

Paragraph 3.1.11 takes into account that in general case the designated range of tyre sizes may differ from that in paragraph 3.1.10, connected with tyre noise level and wet grip adhesion parameters.

Changes are made in paragraph 5.1 in accordance to p.3.1.11, new paragraphs 12.4 and 15.3 are added (see document inf GRB-49-02).

This Amendment to Regulation No.117 concerns the information strategy in the field of tire quality improvement. The end-user information process is de jure independent from standardization although both are naturally connected.

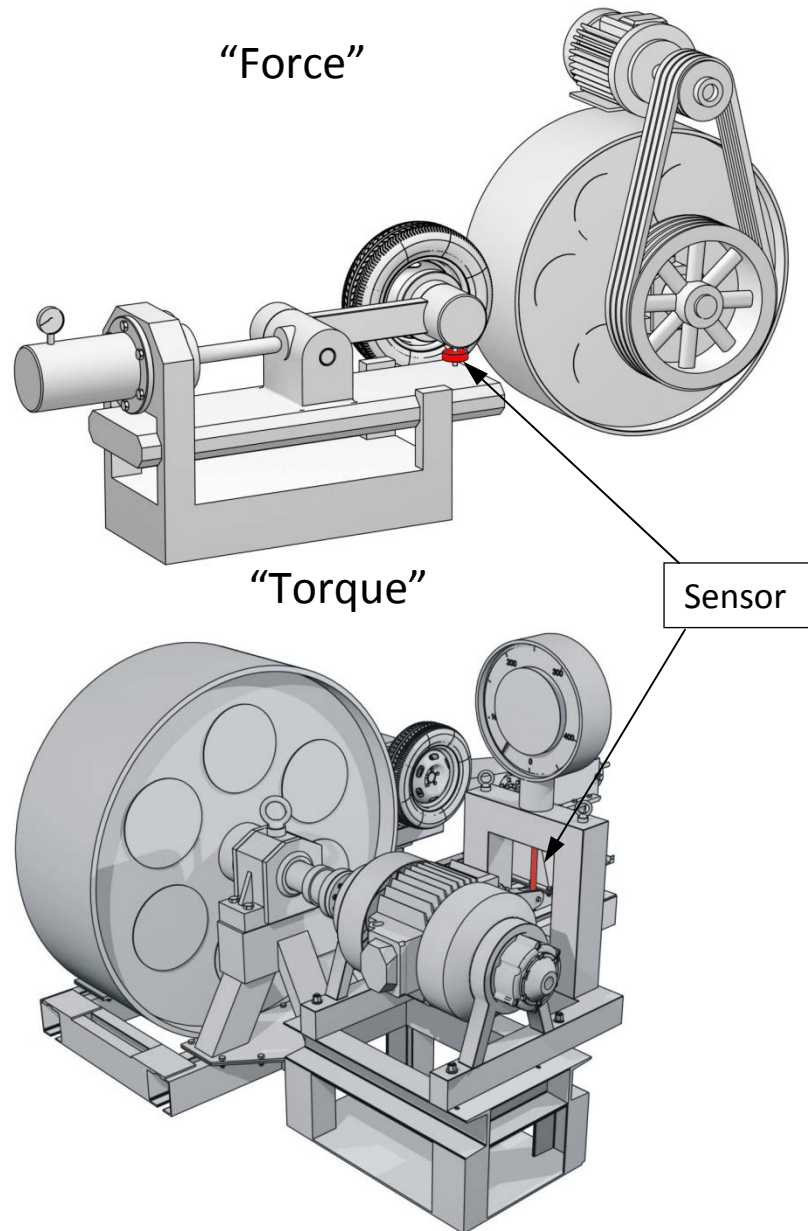
The UNITED NATIONS GUIDELINES FOR CONSUMER PROTECTION (09/29/2001, UNCTAD/DITC/CLP/Misc.21) declare that one the legitimate needs which the guidelines are intended to meet is **”access of consumers to adequate information to enable them to make informed choices according to individual wishes and needs”**.

Although the Information Strategy for tyre industry is rather soft it is more effective then Regulatory Strategy because first of them gives a competitive stimulus to improve tyre quality.

The end-user information strategy presented in the proposed Amendment may be put in action as soon as ISO 28580 is adopted, i.e. this year. It will be used during the period before EC RR norms adoption and then in parallel with them.

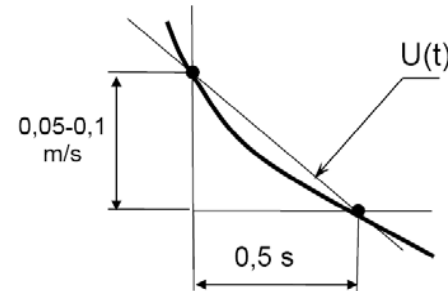


**Methods of tyre rolling resistance measurement are a subject of ISO 18164 and now ISO 28580 (referenced in the proposed amendment)**



“Deceleration”

$$M = \frac{I}{R} \frac{dV}{dt}$$



$$j \approx \frac{\Delta U}{\Delta t} = \frac{U_2 - U_1}{t_2 - t_1} = \frac{\frac{\Delta S_1}{\Delta \tau_1} + \frac{\Delta S_2}{\Delta \tau_2}}{t_2 - t_1} = \frac{\frac{2\pi R}{\tau_2 - \tau_1} + \frac{2\pi R}{\tau_4 - \tau_3}}{t_2 - t_1}$$

where S – distance, t and  $\tau$  – time. So in general case the deceleration error is:

$$\delta_j = \sqrt{\sum_{i=1}^6 \left( \frac{\partial j}{\partial x_i} \right)^2 (\delta x_i)^2}$$

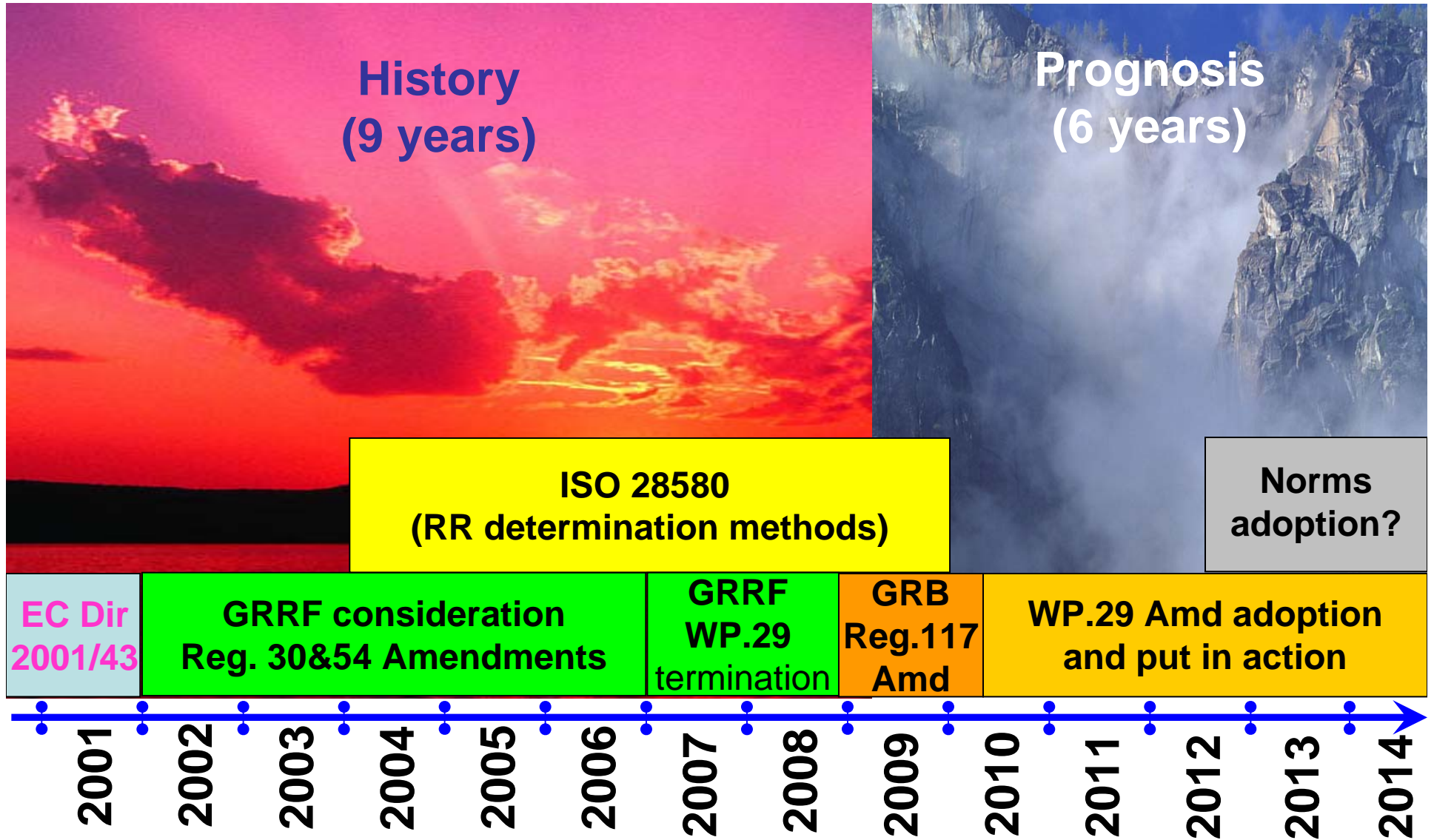
where  $x_i \equiv S_1, S_2, \tau_1 \dots \tau_4, t_1, t_2$ ;

$\delta x_i$  – an error of each parameter.

A new version of the deceleration method is developed and is being added to ISO 18164 as an amendment.



# History of the Rolling Resistance Problem



2.0 million tons of fuel is burnt every day to counteract tyre RR.

## **An example of high social and ecological responsibility of a leading tyre manufacturer**

In 15 years, compared to conventional tires on the road, the 570 million Michelin “green” energy saving tires sold worldwide have reduced fuel consumption by an estimated 2.38 billion gallons, resulting in a reduction of CO<sub>2</sub> emissions of 25 million tons, the equivalent of the amount absorbed by 880 million trees in one year.

This means that each second 11.6 gallons of fuel are saved and 240.6 pounds of CO<sub>2</sub> are not released into the atmosphere.

Michelin is the first company which began to use silica instead of carbon black and developed the passenger tyre with RRC 8 N/kN and now prepared “proxima” tyre with RRC 6.5 N/kN.

“Michelin Green Meters” Press kit, 30 October, 2007 ([www.michelin-green-meter.com](http://www.michelin-green-meter.com))

So, if the new norm is set at the level, for example, of  $RR=12$  N/kN while there are better tyres with  $RR=8$  N/kN on the market, the consumer must be informed that the tyres he buys have  $RR$  value of just 8 N/kN.

The amendment to the Regulation #117 and the future proposal on the  $RR$  tyre labelling will help to achieve this goal.

**Thank you for attention!**