

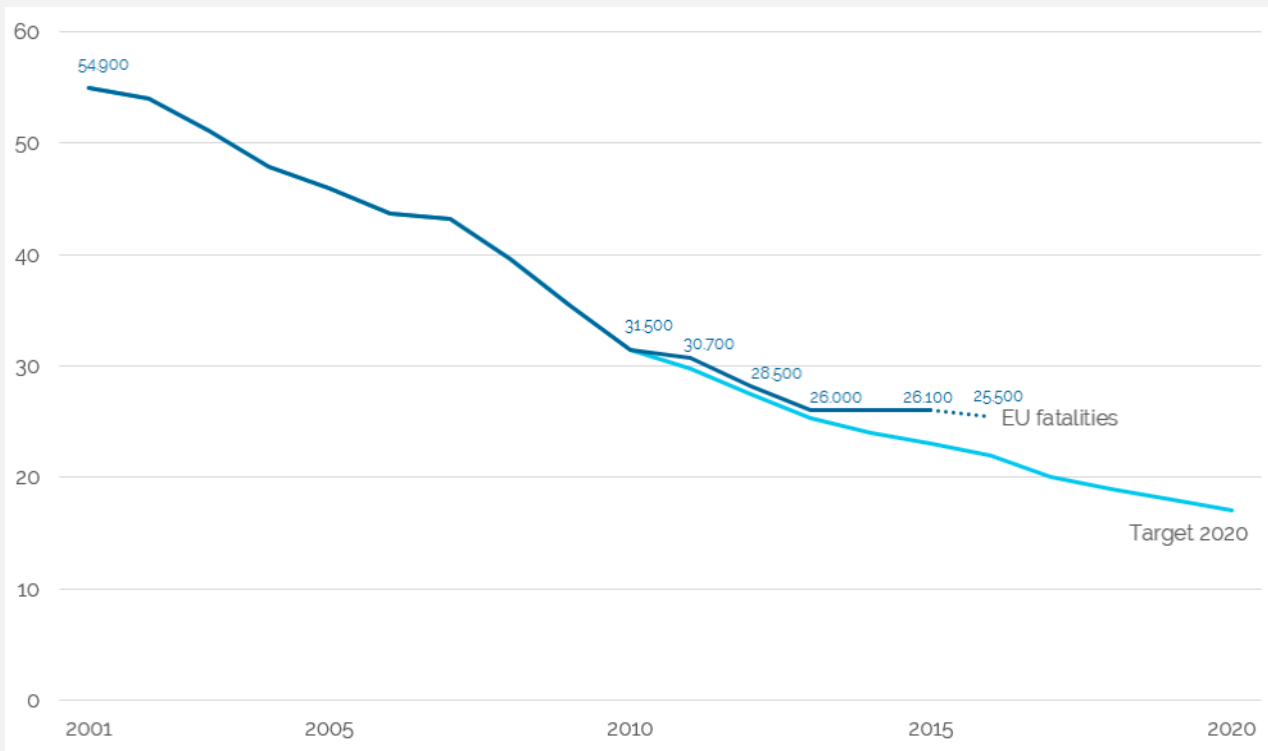
# CLEPA Position Paper

## Tyre Pressure Monitoring Systems

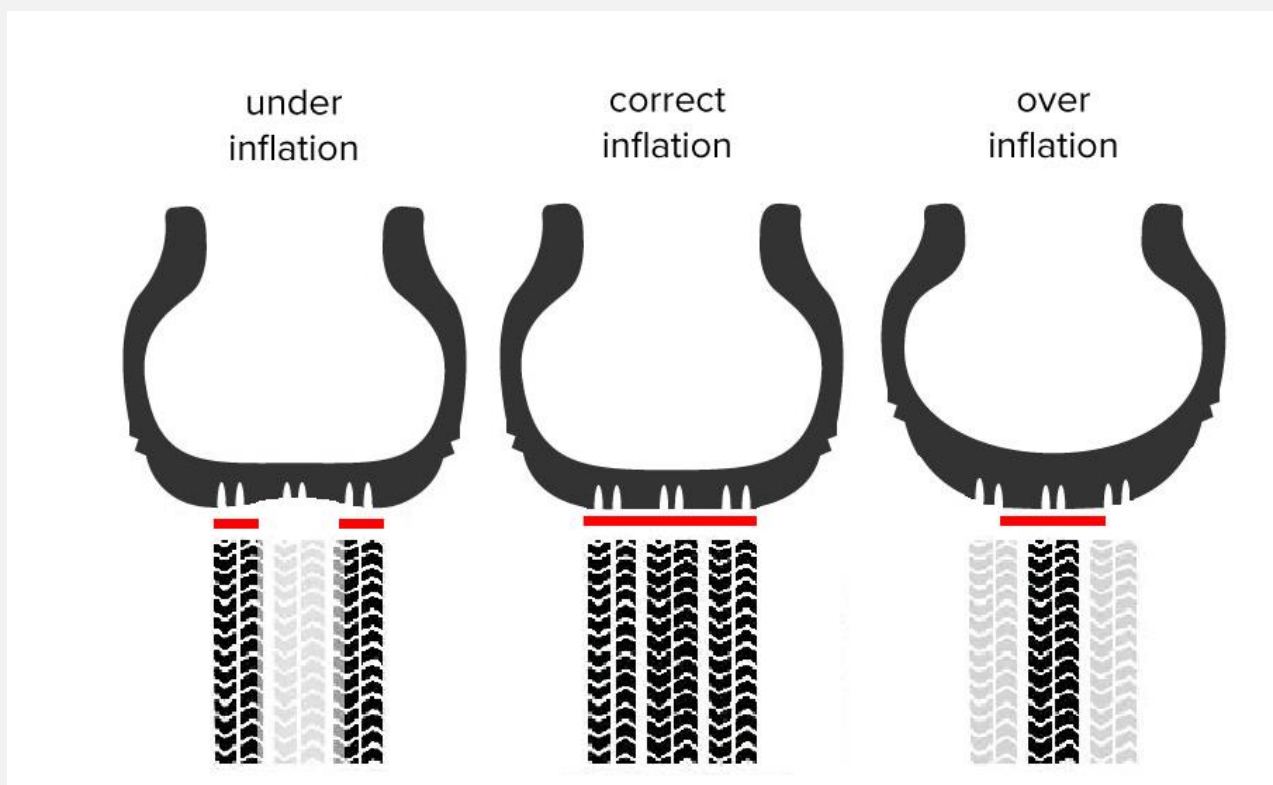
### Review of the General Safety Regulation



## Road fatalities in the EU since 2001



## Tyre inflation



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# Executive summary

CLEPA supports the review of the General Safety Regulation as well as the EU Commission corresponding considerations<sup>1</sup> in order to further implement the TPMS technical requirements, enabling a robust increase of vehicle safety in real world driving conditions and an efficient contribution to the reduction of fuel consumption and CO2 emissions.'

The findings from different independent studies, as reported in the following pages, confirm the mandatory implementation of TPMS in all M, N, O3 and O4 vehicles is cost-efficient.

## Setting the scene

# The General Safety Regulation

Since 1 November 2014, the General Safety Regulation (EC) 661/2009 (GSR) mandated all new passenger cars (M1 vehicles) to be fitted with Tyre Pressure Monitoring Systems (TPMS) as an effective road safety measure, as an optimization of fuel efficiency and a way to reduce CO2 emissions. Since 2014 the revision of the General Safety Regulation has been in progress and a proposal from the EU Commission is expected in early 2018.

The EU Commission **Report COM(2016)787<sup>1</sup>** on “Saving Lives: Boosting Car Safety in the EU” and the related **Staffing Document** considers that :

- [TPMS] should be capable of detecting over a wide range of road and environmental conditions.
- [TPMS] should not be possible to deactivate.
- [TPMS] for M1/N1 should detect less than 1.5bar or detect incorrect set/reset attempt.
- [TPMS] should cover any tyre of approved size, including after-market (different brand) replacement tyres.
- Clause “...vehicle shall be tested with the tyres installed on the vehicle according to the vehicle
  - manufacture's recommendation...” should be deleted
- [TPMS] should be made mandatory for all M, N, O3 and O4 vehicles
  -
- These amendments should be transferred to the UNECE Regulation on TPMS
  -

CLEPA welcomes all the above considerations with the aim to prevent failures and misuses during real world operation and which are necessary for further improving the TPMS regulation.

**TPMS systems are technically and economically mature for application in light commercial vehicles and heavy commercial vehicles. CLEPA supports the extension of the mandatory TPMS regulation to the newly considered vehicle categories as a measure to improve road safety in a relevant and cost effective way.**

## Background information

### Vehicle safety

**Under-inflation is the most common reason of tyre failure (USA Rubber Tire Manufacturers Association RMA 2001).<sup>2</sup> Underinflated tyres experience a greater amount of sidewall flexion than properly inflated tyres, resulting in sluggish handling, longer stopping distances, increased stress to tyre components, and heat buildup.**

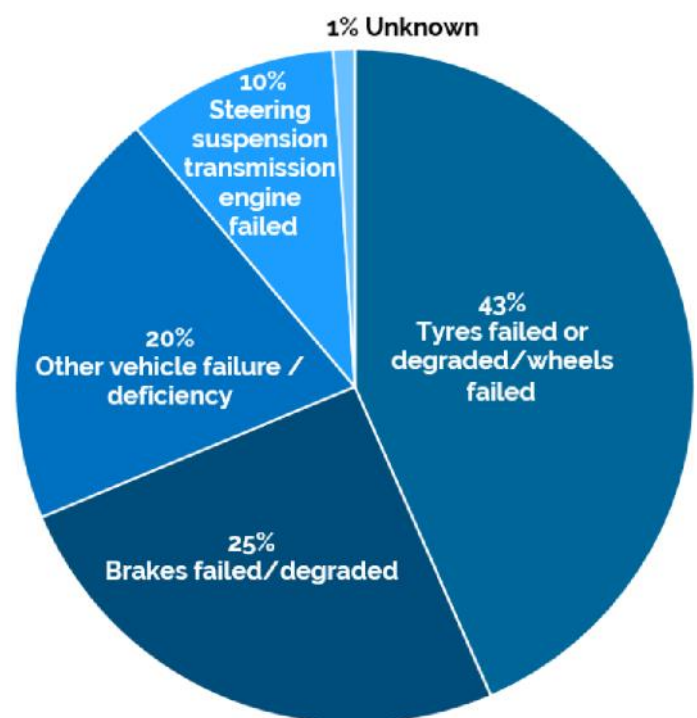
This can lead to catastrophic failure of the tyre, such as cracking, component separation, or blowout. These catastrophic failures can cause loss of vehicle control and may result in a crash (Sivinski – USA National Highway Traffic Safety Administration NHTSA 2012).<sup>3</sup> NHTSA (2008)<sup>4</sup> evaluated: “In cases where the assessment of the vehicle revealed a critical reason related to the vehicle, the failure of a tyre/wheel was the most frequent critical reason” for about 43 percent of the crashes involving passenger cars & light truck vans. According to NHTSA Tyre safety campaign TireWise “each year nearly 11,000 tyre-related crashes, and almost 200 people will die in those crashes. Many of these crashes can be prevented through proper tyre maintenance — including tyre inflation.”

In 2014, “‘Tyres’ were the most common vehicle-related factors for large trucks in fatal crashes, at 1.3 percent” (USA Federal Motor Carrier Safety Administration - FMCSA 2016)<sup>5</sup>

TPMS enhances road safety also through better vehicle stability, that is affected by incorrect tyre inflation and subsequent variation of load conditions. Concerning LCV’s & HDV’s “It is estimated that properly maintaining the tyre inflation pressure can reduce the number of speed and tyre related accidents by 4% to 20%, and the total number of accidents by 0.8% up to 4%” (TNO 2013)<sup>6</sup> which would be a relevant contribution to reducing the total EU costs of road accidents estimated in 100 billion euro.<sup>7</sup>

#### National Highway Traffic Safety Administration NHTSA 2008

Critical reason for critical pre-crash event



The general driver awareness to tyre-inflation and a quick detection of inflation issues within seconds can avoid major safety concerns leading to tyre blowout failures as well as vehicle instability. (TNO 2014)<sup>8</sup>

According to The International Council on Clean Transportation ICCT (2015),<sup>9</sup> interviewed fleets and tyre manufacturers emphasized that installing tyre pressure monitoring systems — is not only interesting for the improved fuel efficiency but, more importantly, to improve safety and increase tyre life.



## Cost savings

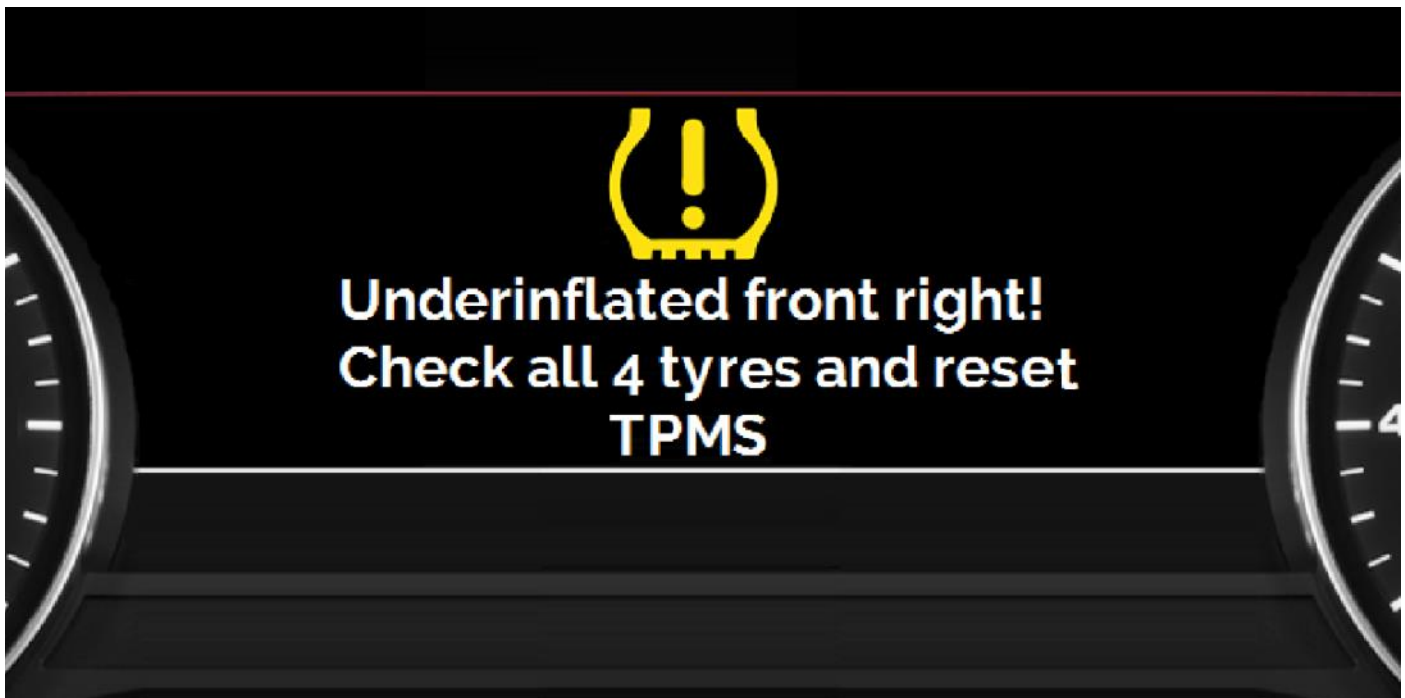
# Tyre pressure maintenance

**Activities on tyre pressure maintenance by using TPMS and increasing consumer awareness outweigh their costs. (TNO 2014)<sup>8</sup>**

Sivinski (NHTSA 2012)<sup>3</sup> indicates that during 2011, TPMS was estimated to have saved \$511 million across the light vehicle fleet (both passenger cars and Light Trucks and Vans (LTV)) through reduced fuel consumption in the US market. This estimate is expected to increase over time as more vehicles without TPMS are retired and replaced by vehicles with TPMS. Had every vehicle in model years 2004- 2011 been equipped with TPMS in the US, the total cost of saved fuel in 2011 would have been \$791 million. This does not include any additional savings that may result from extended tyre life or any crash- avoidance benefits. Major annual cost savings are allocated to most commercial vehicle segments including LCV's, Trucks-only and Truck-trailers, especially at Long Haul Truck Only

(TO) and Truck Trailer (TT) segments (TNO 2013).<sup>6</sup> Commercial fleets<sup>10</sup> interviewed by ICCT (2015)<sup>9</sup> stated "reported payback times between one and two years" for Trailers in the North American On-Road Freight Sector. According to ATA (2008)<sup>11</sup>, "53% of road breakdowns for trucks and tractors were tyre-related, thus making it the topmost factor that results in lost hours and costs from road breakdowns. In summary, under-inflation reduces a tyre's lifespan by as much as 20%." Ogunwemimo (2011)<sup>12</sup> states the average cost of a tyre blowout is 213.500\$, based on statistical likelihood of occurrence and including compensation, legal fees and property damage costs. FMCSA (2011)<sup>13</sup> states a significant reduction of breakdowns for commercial fleets by using TPMS.





## Fuel consumption and

**Fuel consumption savings depend strongly on the considered vehicle class. A field operational test between 2008 and 2009, tasked by FMCSA<sup>13</sup> (US Federal Motor Carrier Safety Administration), presents a reduction of fuel consumption by 1.4% and less emergency road calls caused by damaged or flat tyres within a Commercial Vehicle Fleet.**

Another study from EPA and NHTSA (2016),<sup>14</sup> considering commercial fleets including tractors and trailer in the US, presents fuel savings on the order of 1%. Sivinski (2012)<sup>3</sup> estimated savings due to TPMS operation of 106 litres of fuel at a typical Light Trucks and Vans (LTV)<sup>15</sup> in the US market during the first eight years.

Modern TPMS user interfaces can provide the driver with additional information to help reducing fuel consumption. This has been demonstrated in the survey of Sivinski (NHTSA 2012)<sup>3</sup> where user interfaces showing the individual tyre pressures were 29% more efficient to reduce severe tyre under-inflation than a simple tell-tale.

**“The highest CO2 saving potential is found for N2 and N3 vehicles in long haul operation.”**

(TNO 2013)<sup>6</sup>





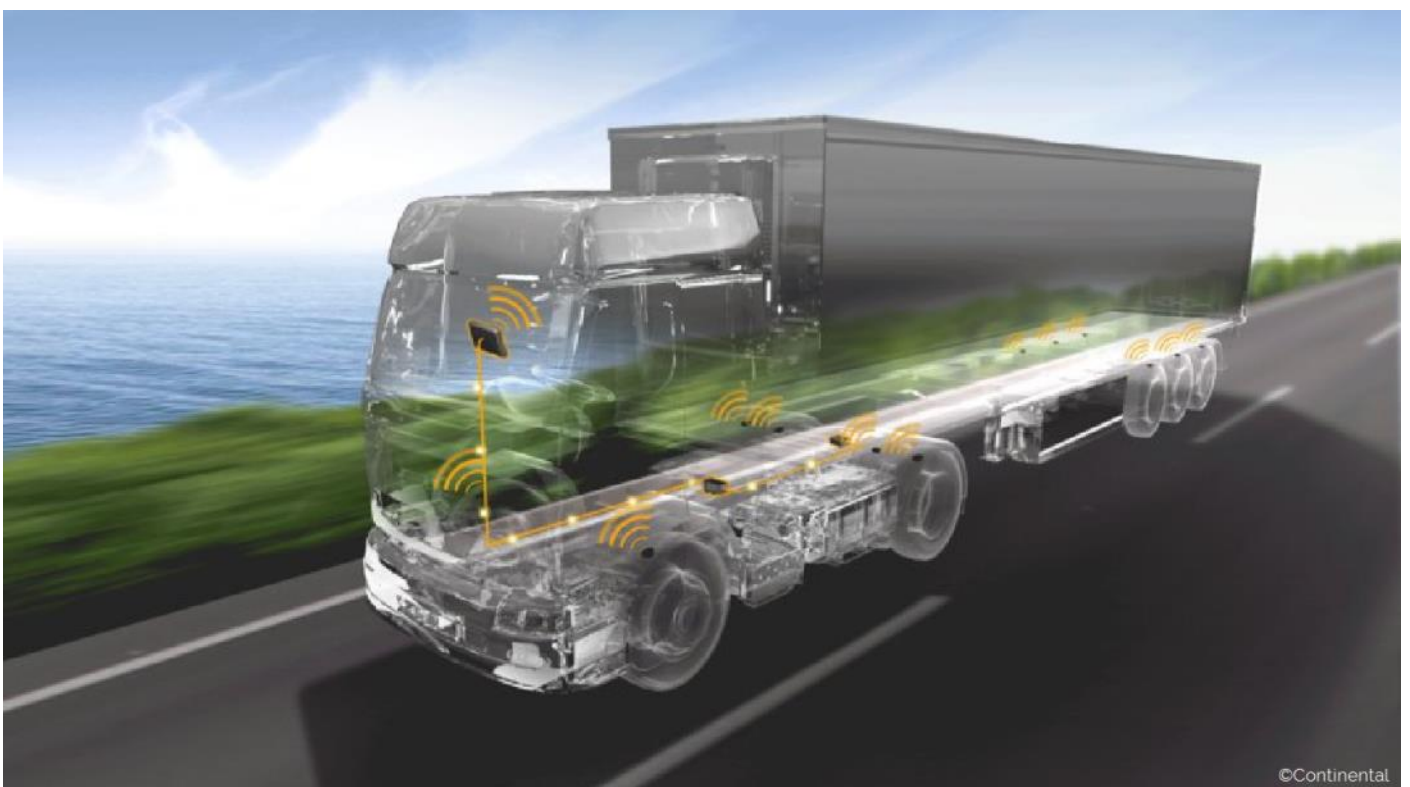
## TPMS efficiency

# To reduce tyre under-inflation

TNO (2014)<sup>8</sup> highlights a relevant ETRMA inflation survey showing that almost 25% of the HDVs drive with tyres severely underinflated by 10% to over 30%. According to VDA<sup>16</sup> there are about 30% of commercial vehicles with underinflated tyres on the road.

The survey of Sivinski (NHTSA 2012)<sup>3</sup> found that using TPMS was estimated to result in a statistically significant 55.6% (and even 75% for 2008-2011 vehicles) reduction in the likelihood that a vehicle will have one or more severely underinflated tyres. It points out a clear difference in the rates of severe under-inflation for surveyed vehicles with and without TPMS as well as in terms of TPMS effectiveness:

- 23.1% of severe under-inflation on the MY 2004-2007 vehicles (majority LTVs) which had no TPMS
- Only 5.7% of severe under-inflation on the MY 2008-2011 vehicles which had direct TPMS
- 
- It also found that TPMS on LTVs are 29% more effective to reduce severe under-inflation than on passenger cars.
- 





## Sources

- <sup>1</sup> COM(2016)787 Saving Lives: Boosting Car Safety in the EU12<sup>th</sup> December 2016 and the related staffing document
- <sup>2</sup> USA Rubber Tire Manufacturers Association RMA 2001: be tire smart - consumer education program
- <sup>3</sup> Sivinski USA National Highway Traffic Safety Administration NHTSA November 2012: Evaluation of the effectiveness of TPMS in proper tire pressure maintenance (Report DOT HS 811 681)
- <sup>4</sup> NHTSA July 2008: National Motor Vehicle Crash Causation Survey (Report DOT HS 811 059)
- <sup>5</sup> USA Federal Motor Carrier Safety Administration FMCSA-RRA-16-001 (March 2016) - Large Truck And Bus Crash Facts 2014
- <sup>6</sup> TNO 2013 R10986 - Final report 29/07/2013: Study on Tyre Pressure Monitoring Systems (TPMS) as a means to reduce Light- Commercial and Heavy-Duty Vehicles fuel consumption and CO2 emissions
- <sup>7</sup> DG MOVE Road Safety: new statistics call for fresh efforts to save lives on EU roads 31/03/2016 press release
- <sup>8</sup> TNO 2014 R11423 - Final report 18/12/2014: Study on some safety-related aspects of tyre use
- <sup>9</sup> The International Council on Clean Transportation ICCT February 2015 - Costs and adoption rates of fuel-saving technologies for trailers in the Canadian on-road freight sector
- <sup>10</sup> Medium and large for-hire and private fleets that operate between roughly 250 and 10,000 tractors and 500 and 30,000 trailers
- <sup>11</sup> American Trucking Associations ATA (2008): Tire Pressure Monitoring and Inflation
- <sup>12</sup> Ogunwemimo, Afolabi A., "Economic Analysis of Continuous Monitoring of Commercial Truck Tire Pressure Using Tire Pressure Monitoring Systems (TPMS) and RFID Technologies." (2011). Industrial and Management Systems Engineering -- Dissertations and Student Research. Paper 24. (<http://digitalcommons.unl.edu/imsediss/24>)
- <sup>13</sup> USA Federal Motor Carrier Safety Administration (FMCSA) 2011: Results from the FMCSA Tire Pressure Monitoring and Maintenance Systems Operational Test
- <sup>14</sup> USA EPA & NHTSA Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles - Phase 2. Regulatory Impact Analysis (EPA-420-R-16-900) August 2016
- <sup>15</sup> US Light Duty trucks and Vans are comparable to EU N1 vehicle class regarding weight classification (40 C.F.R. 86.082-2, Blumberg et al., 2015, p.6) Light-duty truck means any motor vehicle rated at 8,500 pounds (3,855.5 kg) GVWR or less which as a vehicle curb weight of 6,000 pounds or less and which has a basic vehicle frontal area of 45 square feet or less, which is designed primarily for purposes of transportation of property or is a derivation of such a vehicle.
- <sup>16</sup> VDA, „Das Nutzfahrzeug – umweltfreundlich und effizient“ (2.Auflage), German Association of the Automotive Industry

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- European automotive suppliers directly employ 5 million people
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