

1.A.3.b vi-vii - Road Transport: Automobile Tyre and Brake Wear and Road Abrasion

This overview chapter provides information on emissions from automobile tyre and brake wear & road abrasion are reported reported in NFR sub-categories 1.A.3.b vi and 1.A.3.b vii. These sub-categories are important sources for a) particle emissions and b) emissions of heavy metals, POPs etc. included in these particles.

NFR-Code	Name of Category
1.A.3.b vi	Automobile Tyre and Brake Wear
1.A.3.b vii	Automobile Road Abrasion

Methodology

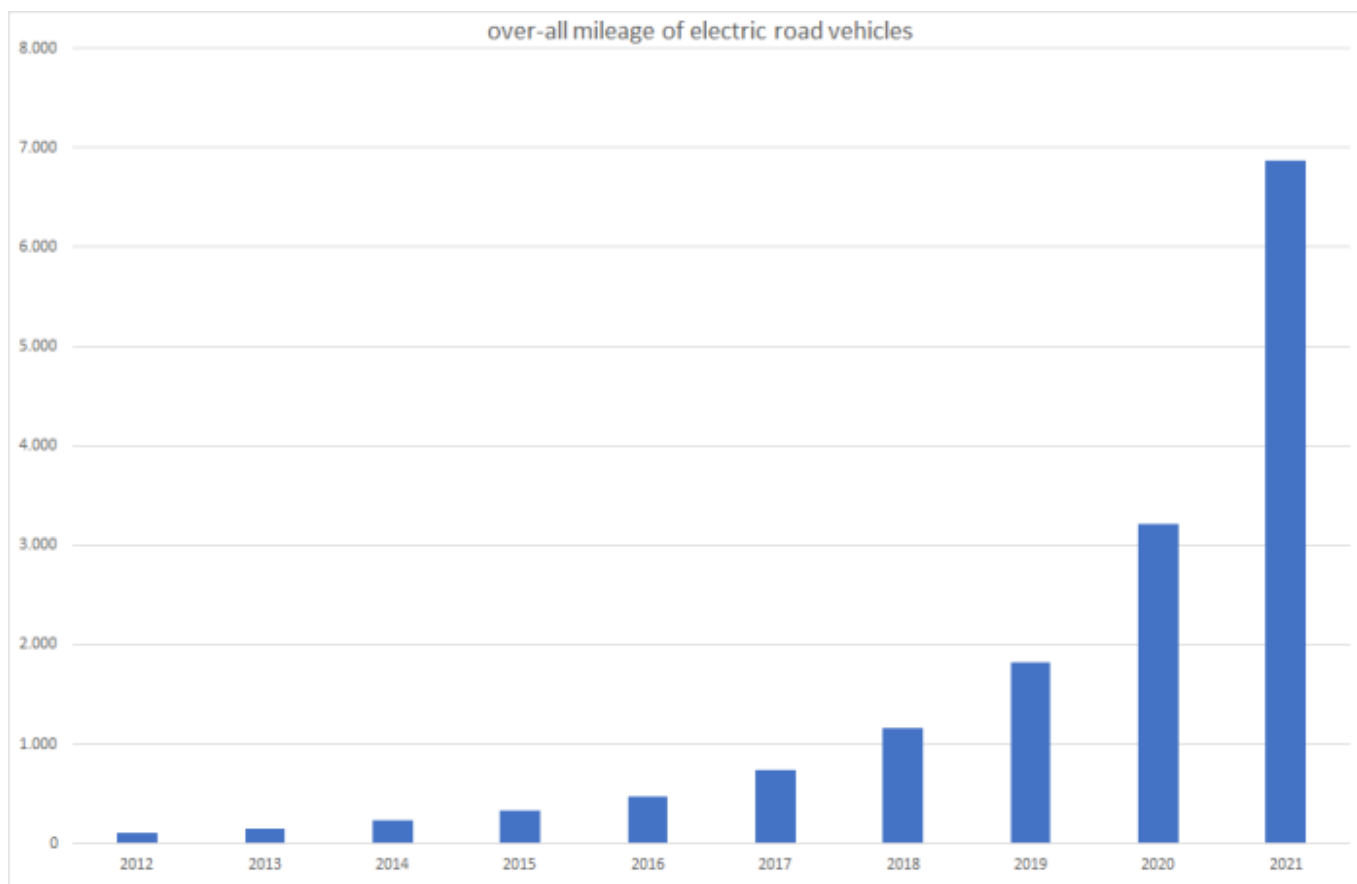
Activity data

Specific mileage data for all different types of road vehicles are generated within TREMOD (Knörr et al., 2022a)¹⁾. The following table provides an overview of annual mileages.

Table 1: Mileage data for road vehicles 1990-2020, in 10⁶ kilometers

	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Passenger Cars	492,280	535,524	565,345	580,076	596,532	606,233	607,519	612,573	623,683	630,995	638,156	643,711	643,198	645,829	548,971	546,127
Light Duty Vehicles	14,259	23,294	31,541	35,938	39,226	39,703	40,185	40,673	43,111	45,329	47,457	49,698	51,917	53,656	50,982	54,570
Heavy Duty Vehicles	40,827	54,025	62,478	60,919	61,935	63,562	63,105	65,194	65,174	66,412	68,409	69,216	70,604	70,007	67,029	68,726
<i>thereof: Lorries & Trucks</i>	36,657	50,109	58,440	56,788	57,728	59,339	58,860	60,896	60,534	61,548	63,061	64,704	66,084	65,435	64,128	65,876
<i>thereof: Buses</i>	4,170	3,916	4,038	4,132	4,208	4,223	4,245	4,298	4,640	4,865	5,349	4,512	4,520	4,572	2,901	2,851
Two-wheelers	15,734	12,303	15,161	15,621	15,298	14,866	14,463	14,196	14,200	14,508	14,519	14,503	14,625	14,842	14,985	13,407
<i>thereof: Mopeds</i>	5,917	3,830	4,047	4,191	4,990	4,855	4,742	4,755	4,684	4,870	4,831	4,730	4,849	4,922	5,039	4,479
<i>thereof: Motorcycles</i>	9,817	8,473	11,113	11,429	10,308	10,011	9,721	9,441	9,516	9,638	9,687	9,773	9,776	9,920	9,946	8,928
TOTAL MILEAGE	563,099	625,145	674,524	692,554	712,991	724,364	725,271	732,636	746,168	757,244	768,541	777,128	780,345	784,334	681,965	682,831

The following chart illustrates the increase in annual mileage of electric road vehicles in 10⁶ kilometers. Despiet the exponential growth, only about 1 per cent of annual mileage was “electric” in 2021.



Discussion of emission trends

Please see sub-category chapters [1.A.3.b vi - Automobile Tyre and Brake Wear](#) and [1.A.3.b vii - Automobile Road Abrasion](#).

Recalculations

Compared to last year's submission, mileage data has been revised widely due to the availability of additional data sources. However, total mileage changed only marginally.

Table 2: Revised total annual mileage data, in 10⁶ kilometers

	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
current submission	563,099	625,145	674,524	692,554	712,991	724,364	725,271	732,636	746,168	757,244	768,541	777,128	780,345	784,334	681,965
previous submission	563,099	625,399	674,705	692,609	714,035	725,321	725,977	731,761	745,817	756,655	766,829	775,277	777,801	783,298	686,804
absolute change	0.00	-253	-181	-55	-1,044	-957	-705	875	351	589	1,712	1,851	2,544	1,036	-4,839
relative change	0.00%	-0.04%	-0.03%	-0.01%	-0.15%	-0.13%	-0.10%	0.12%	0.05%	0.08%	0.22%	0.24%	0.33%	0.13%	-0.70%

¹⁾ Knörr et al. (2022a): Knörr, W., Heidt, C., Gores, S., & Bergk, F.: ifeu Institute for Energy and Environmental Research (Institut für Energie- und Umweltforschung Heidelberg gGmbH, ifeu): Fortschreibung des Daten- und Rechenmodells: Energieverbrauch und Schadstoffemissionen des motorisierten Verkehrs in Deutschland 1960-2035, sowie TREMOD, im Auftrag des Umweltbundesamtes, Heidelberg & Berlin, 2022.