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REPORT FROM THE COMMISSION

under Regulation (EU) 2018/956 analysing the data transmitted by Member States and manufacturers for the reporting period 2021 on CO2 emissions from and fuel consumption of new heavy-duty vehicles

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1. LEGAL BASIS

Article 10 of Regulation (EU) 2018/956 of the European Parliament and of the Council of 28 June 2018 on the monitoring and reporting of CO_2 emissions from and fuel consumption of new heavy-duty vehicles[1] requires the Commission to publish each year a report with its analysis of the data transmitted by Member States and manufacturers for the preceding reporting period. This is the third report under this provision, providing a data analysis for the reporting period 2021 running from 1 July 2021 to 30 June 2022 with a reporting deadline of 30 September 2022.

The CO_2 emissions from and fuel consumption of new heavy-duty vehicles are determined via the Vehicle Energy Consumption Calculation Tool (VECTO), a simulation tool for heavy-duty vehicles developed by the European Commission. The principles underpinning the simulation of new heavy-duty vehicles using VECTO are provided by Regulation (EU) 2017/2400 on the determination of the CO_2 emissions and fuel consumption of heavy-duty vehicles[2].

2. CONTENT OF THE REPORT

In accordance with the requirements of Article 10 of Regulation (EU) 2018/956, this analysis covers the performance of the heavy-duty vehicles fleet of

1) the Union
2) each Member State
3) each manufacturer

All three items above are estimated based on the CO_2 emissions for selected representative heavy-duty vehicle groups for different mission profiles, payload combinations and different fuels. Additionally, selected values on the average fuel consumption of the heavy-duty vehicle fleet of the Union are included.

The analysis also covers the available data on the uptake of new and advanced CO_2 reducing technologies, as well as of alternative powertrains.

It is based on the data available to the Commission on 20 March 2024.

Further performance values can be found in the Central Register for data on heavy-duty vehicles[3].

Results of on-road verification tests could not be added to the report as they are not available to the Commission for the reporting period 2021.

[1] Regulation (EU) 2018/956 of the European Parliament and of the Council of 28 June 2018 on the monitoring and reporting of CO_2 emissions from and fuel consumption of new heavy-duty vehicles (OJ L 173, 9.7.2018, p. 1).

[2] Commission Regulation (EU) 2017/2400 of 12 December 2017 implementing Regulation (EC) No 595/2009 of the European Parliament and of the Council as regards the determination of the CO_2 emissions and fuel consumption of heavy-duty vehicles and amending Directive 2007/46/EC of the European Parliament and of the Council and Commission Regulation (EU) No 582/2011 (OJ L 349, 29.12.2017, p. 1).

[3] As provided for by Article 6 of Regulation (EU) 2018/956. The Central Register is published by the European Environment Agency (EEA) under https://discomap.eea.europa.eu/app/CO2HDV/.

3. DATA BASIS

This report is based on data including all vehicles reported by manufacturers, matched by registrations in the Member States during the reporting period of 2021. These cover lorries in vehicle groups 1, 2, 3, 4, 5, 9, 10, 11, 12 and 16.

All these lorries are defined as heavy lorries in Regulation (EU) 2017/2400. This report, when relevant, distinguishes between lorries below (groups 1, 2 and 3) and above (4, 5, 9, 10, 11, 12 and 16) 16 tonnes of technically permissible maximum laden mass.

Buses and coaches are not included.

4. ANALYSIS FOR THE 2021 REPORTING PERIOD

4.1 CO_2 emissions and fuel consumption

This section provides an analysis of the CO_2 emissions by Member States, manufacturers, vehicle groups and different mission profiles. Additionally, selected values on fuel consumption, as well as different fuel types used by the newly registered vehicles are presented. Heavy duty vehicles with alternative powertrains, i.e. zero-emission vehicles, hybrid electric vehicles, and dual-fuel vehicles, are separately discussed in section 4.2. To be noted that sometimes not all the information required is available. Therefore some vehicles have been excluded from certain tables, which explains why the total vehicles shown in the different tables does not always match.

4.1.1 Performance of the fleet of the Union

The reported CO_2 emissions strongly depend on the vehicle groups and sub-groups[4].

Table 1 provides data on the composition and CO_2 emissions of the vehicle groups and sub-groups. In particular, it shows the number of vehicles as well as the average specific CO_2 emissions of different groups and sub-groups. The very large majority of matched lorries below 16 tonnes of technically permissible maximum laden mass belong to groups 2 and 3. As regards lorries above 16 tonnes, the vehicles in sub-group 5-Long Haul (5-LH) represent 70% of all new lorries above 16 tonnes. These are the most common vehicles used for long-haul freight transportation in the EU.

Average specific CO_2 emissions of a heavy-duty vehicle from a given sub-group are calculated as a weighted mean over different mission profiles[5] as defined in Annex I of Regulation (EU) 2019/1242. For vehicle groups 1, 2, 3, 11, 12 and 16, the mission profile weights used for all calculations in this report are not yet defined in legislation[6].

[4] The vehicle sub-groups reflect the vehicles' typical usage pattern and specific technical characteristics. They are defined by Annex I of Regulation (EU) 2019/1242.

[5] Regulation (EU) 2019/1242 defines a mission profile as a "combination of a target speed cycle, a payload value, a body or trailer configuration and other parameters, if applicable, reflecting the specific use of a vehicle".

[6] The definitions used for this report can be found in Annex A.1 of COM(2023) 517 final

Table 1 also provides the average payload[7] in tonnes for all vehicle groups as well as the average specific CO_2 emissions in g/tkm, calculated dividing the average specific CO_2 emissions in g/km by the average payload in tonnes.

Table 1: Number of vehicles, average specific CO_2 emissions in g/km, average payload in tonnes and average specific CO_2 emissions in g/tkm per vehicle group and sub-group (note: RD stands for vehicles used mostly for Regional Delivery, LH for Long Haul, and UD for Urban Delivery)

Vehicle group	Vehicle sub-group[8]	Number of vehicles	Average specific CO_2 emissions (g/km)	Average payload (t)	Average specific CO_2 emissions (g/tkm)
1	-	2 455	610	1.44	424
2	-	8 648	627	2.34	268
3	-	8 013	700	3.37	208
4	4-UD	72	813	2.65	307
	4-RD	11 221	628	3.18	198
	4-LH	3 816	730	7.42	98
	vocational	115	1 437		
5	5-RD	1 031	860	10.26	84
	5-LH	146 009	768	13.84	55
	vocational	0	-		
9	9-RD	12 657	698	6.28	111
	9-LH	17 180	843	13.40	63
	vocational	832	1 621		
10	10-RD	45	811	10.26	79
	10-LH	6 343	801	13.84	58
11	-	2 589	835	5.39	155
12	-	1 479	1 015	9.81	104
16	-	4 085	1 082	9.81	110
EU total	-	226 590			

[7] Annex A.2 of REPORT FROM THE COMMISSION under Regulation (EU) 2018/956 analysing the data transmitted by Member States and manufacturers for the reporting period 2020 on CO2 emissions from and fuel consumption of new heavy-duty vehicles, COM(2023) 517 final, provides a description on how the average payload has been calculated for all vehicle groups.

[8] As defined in Regulation (EU) 2019/ 1242

4.1.2 Performance of the fleet per Member States

Table 2 provides information on the average specific CO_2 emissions[9] in g/km for each Member State. Vocational vehicles as well as vehicles whose CO_2 emissions are not certified (such as dual fuel and hybrid vehicles) are not taken into account. For conciseness reasons, only emission values for vehicle (sub)group 2, sub-group 5-Long-Haul (5-LH), and group 16 are shown. These 3 (sub)groups have been selected as the representative groups for lorries below 16 tonnes (groups 1, 2, and 3) and lorries above 16 tonnes (currently subject to the CO_2 standards: groups 4, 5, 9, and 10; not subject to current CO_2 standards: groups 11, 12 and 16) respectively[10].

[9] Annex A.3 of REPORT FROM THE COMMISSION under Regulation (EU) 2018/956 analysing the data transmitted by Member States and manufacturers for the reporting period 2020 on CO2 emissions from and fuel consumption of new heavy-duty vehicles, COM(2023) 517 final, provides a description on how the average specific CO2 emissions, are calculated

[10] For the lorries below 16 tonnes, groups 2 and 3 contain a comparable number of vehicles. Regarding the average specific CO_2 emissions and average payload, group 2 is "in between" groups 1 and 3 (see Table 2), and hence best represents these lorries. Sub-group 5-LH and group 16 are a representative group, as they account for the highest share of newly registered lorries above 16 tonnes in the groups which are and are not subject to the current CO_2 standards, respectively. In some countries, no group 16 vehicle has been registered in the reporting period, and hence their average emissions are not available.

Table 2: Average specific CO_2 emissions in g/km of vehicle (sub)groups 2, 5-LH and 16, as well as the number of lorries registered in each Member State in certain groups

	Lorries below 16 tonnes		*Lorries above 16 tonnes*			
	Groups 1, 2, 3 No. of vehicles	Group 2 Avg. spec. CO_2 em. (g/km)	Groups 4, 5, 9, 10 No. of vehicles	Sub-group 5-LH Avg. spec. CO_2 em. (g/km)	Groups 11, 12, 16 No. of vehicles	Group 16 Avg. spec. CO_2 em. (g/km)
Austria	397	631	3 780	777	290	1 090
Belgium	729	623	5 478	778	647	1 061
Bulgaria	53	613	2 908	748	4	1 013
Croatia	132	625	809	763	24	1 120
Cyprus	12	-	11	762	0	-
Czechia	695	653	6 101	765	285	1 080
Denmark	275	607	2 862	757	455	1 072
Estonia	12	595	497	754	63	1 083
Finland	138	629	1 118	775	758	1 102
France	3 891	608	31 156	772	1 629	1 089
Germany	6 847	625	42 543	774	1 512	1 065
Greece	82	630	221	771	4	1 089
Hungary	113	632	4 266	764	20	1 130
Ireland	168	642	1 347	761	79	1 059
Italy	1 778	682	16 901	773	121	1 095
Latvia	11	587	1 359	759	77	1 010
Lithuania	16	616	6 974	765	39	-
Luxemburg	3	630	609	786	6	1 051
Malta	3	660	1	-	0	-
Netherlands	683	608	9 408	766	275	1 060
Poland	935	638	26 900	760	350	1 092
Portugal	173	666	3 052	762	80	1 150
Romania	117	633	4 839	767	41	1 084
Slovakia	166	634	2 349	760	44	1 082
Slovenia	43	650	1 691	758	31	1 118
Spain	1 277	627	16 955	765	132	1 102
Sweden	360	592	3 122	755	1 177	1 084
Unknown[11]	3	-	87	781	5	1 086
EU total	19 112	627	197 344	768	8 148	1 082

[11] Unknown vehicles are those registered in more than one Member State, and then they could not be attributed to one precise Member State.

4.1.3 Performance of the fleet of the manufacturers

Table 3 presents average specific CO_2 emissions in g/km, for all manufacturers, in line with the data presented in **Table 2**.Vocational vehicles are not taken into account.

Table 3: Average specific CO_2 emissions in g/km of vehicle (sub)groups 2, 5-LH and 16

	Lorries below 16 tonnes		*Lorries above 16 tonnes*			
	Groups 1, 2, 3 Number of vehicles	Group 2 Average specific CO_2 emissions (g/km)	Groups 4, 5, 9, 10 Number of vehicles	Sub-group 5-LH Average specific CO_2 emissions (g/km)	Groups 11, 12, 16 Number of vehicles	Group 16 Average specific CO_2 emissions (g/km)
ANADOLU ISUZU OTOMOTIV SANAYII VE TICARET A.S.	100					
DAF Trucks N.V.	1 837	668	35 615	771	279	1 035
Daimler Truck AG	4 767	628	38 296	781	1 103	1 122
Ford Otomotiv Sanayi A.S.	0	-	3 625	808	0	-
ISUZU MOTORS LIMITED	45	752	0	-	0	-
Iveco S.p.A.	3 418	700	1 078	-	0	-
Iveco-Magirus A.G.	0	-	13 551	792	648	1 107
MAN Truck & Bus AG	4 228	601	25 541	754	960	1 043
Mitsubishi Fuso Truck & Bus Corporation	444	-	0.0	-	0	-
RENAULT TRUCKS	3 003	577	19 492	785	386	1 081
SCANIA CV AB	0.0	-	24 211	728	1 849	1 071
VOLVO TRUCK CORPORATION	1 270	593	35 935	761	2 923	1 090
EU total	**19 112**	**627**	**197 344**	**768**	**8 148**	**1 082**

Table 4 and **Table 5** present the number of vehicles registered, for all manufacturers, in different groups and subgroups, respectively. Vocational vehicles are not included.

Table 4: Number of vehicles per vehicle group for each manufacturer, for groups 1,2, 3, 11, 12 and 16

	Vehicle Group						**Total**
	1	2	3	11	12	16	
ANADOLU ISUZU OTOMOTIV SANAYII VE TICARET A.S.	100	0	0	0	0	0	100
DAF Trucks N.V.	79	873	885	107	46	126	2 116
Daimler Truck AG	429	2 164	2 174	292	246	565	5 870
Ford Otomotiv Sanayi A.S.	0	0	0	0	0	0	0
ISUZU MOTORS LIMITED	0	25	20	0	0	0	45
Iveco S.p.A.	452	1 446	1 520	0	0	0	3 418
Iveco-Magirus A.G.	0	0	0	268	28	352	648
MAN Truck & Bus AG	911	2 189	1 128	219	161	580	5 188
Mitsubishi Fuso Truck & Bus Corporation	444	0	0	0	0	0	444
RENAULT TRUCKS	0	1 485	1 518	143	37	206	3 389
SCANIA CV AB	0	0	0	575	302	972	1 849
VOLVO TRUCK CORPORATION	40	466	764	983	656	1284	4 193
Total	2 455	8 648	8 009	2 587	1 476	4 085	27 260

Table 5: Number of vehicles per vehicle sub-group for each manufacturer, for groups 4, 5, 9 and 10

	Vehicle sub-group									**Total**
	4-UD	4-RD	4-LH	5-RD	5-LH	9-RD	9-LH	10-RD	10-LH	
ANADOLU ISUZU OTOMOTIV SANAYII VE TICARET A.S.	0	0	0	0	0	0	0	0	0	0
DAF Trucks N.V.	9	1 086	435	69	30 856	521	1 834	3	802	35 615
Daimler Truck AG	0	1 746	1 017	410	27 776	2 725	4 020	7	595	38 296
Ford Otomotiv Sanayi A.S.	0	259	1	1	3 283	64	17	0	0	3 625
ISUZU MOTORS LIMITED	0	0	0	0	0	0	0	0	0	0
Iveco S.p.A.	14	1 064	0	0	0	0	0	0	0	1 078
Iveco-Magirus A.G.	0	331	166	71	10 079	1 601	1 160	0	143	13 551
MAN Truck & Bus AG	0	1 998	618	189	17 006	2 384	2 696	15	635	25 541
Mitsubishi Fuso Truck & Bus Corporation	0	0	0	0	0	0	0	0	0	0
RENAULT TRUCKS	0	2 123	576	71	13 644	1 927	898	0	253	19 492
SCANIA CV AB	49	1 196	549	131	15 496	1 958	3 036	12	1 784	24 211
VOLVO TRUCK CORPORATION	0	1 418	443	87	27 058	1 469	3 360	8	2092	35 935
Total	72	11 221	3 805	1 029	145 198	12 649	17 021	45	6 304	197 344

4.1.4 CO_2 emissions at different mission profiles/payload combinations

In VECTO, all vehicles are simulated over different mission profiles and with two different payloads (low or representative). Each vehicle group is simulated over a defined number of corresponding mission profiles.

Table 6 presents average specific emissions in g/km and g/tkm from vehicle groups 2, subgroup 5-LH and group 16.

Table 6: Average specific CO_2 emissions in g/km and g/tkm of vehicle groups 2, 5, and 16 for each mission profile

	Lorries below 16 tonnes		*Lorries above 16 tonnes*			
	Vehicle group 2		Vehicle sub-group 5 LH		Vehicle group 16	
Mission profile / payload[12]	Average CO_2 emissions (g/km)	Average CO_2 emissions (g/tkm)	Average CO_2 emissions (g/km)	Average CO_2 emissions (g/tkm)	Average CO_2 emissions (g/km)	Average CO_2 emissions (g/tkm)
RDL	509	849	659	253	-	-
RDR	548	183	820	64	-	-
LHL	670	515	632	243	-	-
LHR	774	79	826	43	-	-
UDL	646	1 076	1 043	401	-	-
UDR	746	249	1 434	111	-	-
REL	-	-	835	239	-	-
RER	-	-	1 059	61	-	-
LEL	-	-	797	228	-	-
LER	-	-	1 073	40	-	-
MUL	-	-	-	-	-	-
MUR	-	-	-	-	-	-
COL	-	-	781	300	909	350
COR	-	-	1 009	78	1 156	90

4.1.5 CO_2 emissions and fuel consumption by fuel type

Table 7 provides the average specific CO_2 emissions by fuel type. Similarly to **Table 2** and **Table 3**, it presents values for vehicle (sub)groups 2, 5-LH and 16, excluding vocational vehicles. A more detailed analysis of the different fuels used by newly registered vehicles is given in section 4.2.2 Alternative fuels.

[12] The mission profiles are defined in Table 2 of Annex I of Regulation (EU) 2019/1242

Table 7: Number of vehicles, average specific CO2 emissions in g/km and average fuel consumption of vehicle (sub)groups 2,5-LH and 16 by fuel type

	Lorries below 16 tonnes			*Lorries above 16 tonnes*					
	Vehicle group 2			Vehicle sub-group 5-LH			Vehicle group 16		
Fuel type (engine)	Number of vehicles	Av. spec. CO_2 emissions (g/km)	Average fuel consumption	Number of vehicles	Av. spec. CO_2 emissions (g/km)	Average fuel consumption	Number of vehicles	Av. spec. CO_2 emissions (g/km)	Average fuel consumption
Diesel (CI)	8 503	627	24 l/100 km	141 119	768	29 l/100 km	4039	1 083	41 l/100 km
Ethanol (CI)	0	-	-	0	-	-	2	1 089	73 l/100 km
LNG (PI)	0	-	0	3 182	753	272 g/km	6	1 009	364 g/km
CNG (PI)	143	609	226 g/km	875	754	280 g/km	38	1 051	391 g/km
Unknown	2	627		14	794		0	-	-
EU	8 648	627		145 190	768		4 085	1 082	

4.2 Advanced CO_2 technologies and alternative powertrains

This section focuses on the use of advanced and alternative technologies within the vehicles registered. In particular, it lists the total number of vehicles and the share of the fleet equipped with a given technology. It compares the fleets of different manufacturers and Member States.

4.2.1 Advanced CO_2 technologies

During the reporting period of 2021, manufacturers could, but were not obliged to, indicate additional "advanced CO_2 technologies"[13]. This information had no influence on VECTO simulation results.

Out of all new vehicles of the manufacturer which has reported on such technologies, 67% were equipped with an active front grille, classified as an advanced aerodynamic measure. Furthermore, around 95% of its new vehicles were equipped with a pulse and glide technology, leading to more energy-efficient driving.

No conclusions about advanced CO_2 technologies within the whole fleet of the Union can be drawn.

Besides this optional information on "advanced CO_2 technologies", the manufacturers had to indicate whether the registered vehicle is equipped with an advanced driver-assistance systems (ADAS) technology[14]. **Table 8** presents the total number of vehicles equipped with an ADAS technology.

[13] Field 74 of Table 2 in Annex I of Regulation (EU) 2018/956.
[14] Fields 97-100 of Table 2 in Annex I of Regulation (EU) 2018/956.

Table 8: Number of vehicles per vehicle group equipped with an ADAS technology

	Vehicle group										Total
ADAS technology	1	2	3	4	5	9	10	11	12	16	
Engine stop-start during vehicle stop	0	0	0	0	0	0	0	0	0	0	0
Eco-roll without engine stop-start	319	2 257	2 244	5 770	126 510	18 036	4 338	1564	1017	2209	164 264
Eco-roll with engine stop-start	0	0	0	0	0	0	0	0	0	0	0
Predictive cruise control	0	0	0	2 763	94 989	9 062	2 729	512	446	916	111 417
Total number of vehicles in group	2 455	8 648	8 013	15 224	147 040	30 669	6 388	2 589	1 479	4 085	226 590
Share of vehicles equipped with at least 1 ADAS (%)	13	26	28	38	86	59	68	64	71	57	73

No vehicles registered during the reporting period of 2021 were equipped with the ADAS technologies “engine stop-start during vehicle stop” or “eco-roll with engine stop-start”.

4.2.2 Alternative fuels

The fuel and engine type of a registered vehicle were mandatory specifications during the reporting period as they have an impact on the emissions determination via VECTO. Even though almost 97% of vehicles registered use Diesel, a small amount of newly registered vehicles uses ethanol, LNG, or CNG. **Table 9** gives an overview of the different fuel and engines within the vehicle groups.

Table 9: Number of vehicles per vehicle group by fuel type (AF: Alternative Fuels)

		Vehicle group										Total
	Fuel type (engine)	1	2	3	4	5	9	10	11	12	16	
Conventional fuels	Diesel (CI)	2 451	8 503	7 913	14 573	142 118	28 889	6 337	2 576	1 475	4 039	218 874
	Petrol (CI)	0	0	0	0	0	0	0	0	0	0	
Alternative fuels	Ethanol (CI)	0	0	0	2	0	4	0	0	0	2	8
	Ethanol (PI)	0	0	0	0	0	0	0	0	0	0	
	LNG (PI)	0	0	0	65	3 189	369	7	0	0	6	3 636
	CNG (PI)	3	143	81	453	901	1 091	3	10	1	38	2 724
	Total number of vehicles in group	2 455	8 648	8 013	15 224	147 040	30 669	6 388	2 589	1 479	4 085	226 590
	Share of vehicles using AF (%)	0%	2%	1%	3%	3%	5%	0%	0%	0%	1%	2.8%

Table 10 shows data per Member State in terms of the number of vehicles using alternative fuels. The data are summed up within the two most important categories: lorries below 16 tonnes (i.e. groups 1, 2, and 3), as well as lorries above 16 tonnes (i.e. groups 4, 5, 9, 10, 11, 12 and 16) and exclude the alternative powertrains presented in the next section.

Table 10: Number of vehicles per Member State by fuel. Gas powered include LNG and CNG

	Vehicle groups 1 ,2, and 3			Vehicle groups 4, 5, 9, 10, 11, 12 and 16			Total number of vehicles (excl. ZEV)	*Share of vehicles using AF (%)*
Member State	Diesel (CI)	Ethanol (CI)	Gas powered	Diesel (CI)	Ethanol (CI)	Gas powered		
Austria	397	0	0	4050	0	23	4 470	1%
Belgium	721	0	8	6 003	0	149	6 881	2%
Bulgaria	51	0	2	2 792	0	119	2 964	4%
Croatia	132	0	0	827	0	1	960	0%
Cyprus	12	0	0	11	0	0	23	0%
Czechia	695	0	0	6 365	0	31	7 091	0%
Denmark	276	0	0	3 298	0	80	3 654	2%
Estonia	12	0	0	552	0	7	571	1%
Finland	137	0	1	1 809	0	55	2 002	3%
France	3767	0	119	31 257	7	1 459	36 609	4%
Germany	6841	0	1	43 272	0	1 164	51 278	2%
Greece	82	0	0	248	0	0	330	0%
Hungary	113	0	0	4 282	0	3	4 398	0%
Ireland	168	0	0	1 417	0	13	1 598	1%
Italy	1753	0	24	16 312	0	736	18 825	4%
Latvia	11	0	0	1 367	0	69	1 447	5%
Lithuania	16	0	0	6 919	0	94	7 029	1%
Luxemburg	3	0	0	612	0	6	621	1%
Malta	3	0	0	1	0	0	4	0%
Netherlands	680	0	1	9 571	0	217	10 469	2%
Poland	919	0	16	26 417	0	869	28 221	3%
Portugal	166	0	7	3 096	0	35	3 304	1%
Romania	117	0	0	4 788	0	102	5 007	2%
Slovakia	166	0	0	2 360	0	33	2 559	1%
Slovenia	43	0	0	1 709	0	14	1 766	1%
Spain	1 224	0	48	16 438	0	645	18 355	4%
Sweden	359	0	0	4 143	1	208	4 711	4%
Unknown[15]	3	0	0	91	0	1	95	1%
Total EU	18 867	0	227	200 007	8	6 133	225 242	3%

[15] Unknown vehicles are those registered in more than one Member State, and then they could not be attributed to one precise Member State.

Differences between Member States might result from differently developed re-filling infrastructures for alternative fuels, e.g. CNG/LNG. Nonetheless, the number of registered vehicles using alternative fuels is low throughout the whole EU.

4.2.3 Alternative powertrains

Regulation (EU) 2019/1242 defines a zero-emission heavy-duty vehicle (ZEV) as a vehicle without an internal combustion engine, or with an internal combustion engine that emits less than 1 g CO_2/kWh, or less than 1 g CO_2/km.

27 hybrid electric[16] and 1290 dual-fuel vehicles[17] have been registered in the reporting period 2021 in the vehicle groups covered by the report, including those in group 0 (between 3.5 and 7.5 tonnes) **Table 11** shows that the number of zero-emission vehicles registered during the reporting period was very limited.

Table 11: Number of ZEV (Zero Emission Vehicles) by manufacturer

Manufacturer	ZEV	*Share of ZEV*
ANADOLU ISUZU OTOMOTIV SANAYII VE TICARET A.S.	0	0.00%
DAF NV	17	0.04%
DAIMLER TRUCK AG	21	0.05%
FORD OTOMOTIV SANAYI AS	0	0.00%
ISUZU MOTORS LIMITED	0	0.00%
IVECO SPA	0	0.00%
IVECO MAGIRUS AG	0	0.00%
MAN TRUCK AND BUS SE	13	0.04%
MITSUBISHI FUSO TRUCK & BUS CORPORATION	0	0.00%
RENAULT TRUCK SA	85	0.37%
SCANIA CV AB	67	0.26%
VOLVO TRUCK CORPORATION	84	0.20%
Total number of vehicles	287	0.13%

Out of these 287 battery-electric vehicles, 120 belong to the sub-group 4-LH (the subgroup with the highest number of vehicles).

5. CONCLUSION

This third report aims to present the status quo of the EU's heavy-duty vehicle fleet.

The report compares the performance of the fleets of different Member States, manufacturers, and vehicle groups. It provides selected values on CO_2 emissions, fuel consumption, as well

[16] A hybrid electric vehicle is a vehicle combining an internal combustion engine with an electric motor

[17] A dual-fuel vehicle is a vehicle with an internal combustion engine that is designed to operate on two different fuels at the same time

as the share of alternative technologies in heavy-duty vehicles registered during the third reporting period. This section summarises the key observations from the reported data.

5.1 CO_2 emissions

A fair comparison of the performance of different Member States and manufacturers in terms of the average specific CO_2 emissions of their fleets is only possible within a given group or sub-groups (for lorries in groups 4, 5, 9 and 10).

Within the representative group for lorries below 16 tonnes, i.e. group 2, significant differences among the fleets of different Member States and manufacturers can be observed. The relative difference between the best- and the worst-performing Member State's fleet is of more than 16% (see **Table 2**). For the manufacturers, the relative difference accounts to around 30% (see **Table 3**).

As for the lorries above 16 tonnes, the variation between the Member States' fleets amounts to 5% for the 5-Long Haul group and 14% for group 16. Likewise, for manufacturers, this disparity reaches around 11% in the 5-LH group and 8% in group 16. Furthermore, the data on the uptake of advanced technologies indicates that nearly three quarters of the newly registered vehicles are equipped with at least one advanced driver-assistance system. The data on additional advanced CO_2 technologies is limited, but suggests that a high share of vehicles might be equipped with advanced aerodynamic measures or a pulse and glide technology.

5.2 Fuels and powertrains

At present, diesel vehicles still account for more than 97% of all newly registered heavy-duty vehicles covered in this report[18]. Only a limited number of vehicles use alternative fuels or alternative powertrains, mostly LNG and CNG.

The share of vehicles using alternative fuels, i.e. ethanol, CNG, or LNG, significantly varies between the Member States. While it is very low (well below 0.5%) in Croatia, Cyprus, Greece, Hungary and Malta, it reaches a share of above 4% in Bulgaria, France, Italy, Latvia and Sweden (see **Table 10**). This is due to a relatively high share of natural gas vehicles, reflecting a quite well-developed gas refilling infrastructure in these countries.

Currently, the number of zero-emission heavy-duty vehicles across the EU is small, with only 287 battery-electric vehicles matched during the 2021 reporting period (see **Table 11**)

[18] No distinction has been made between engines that are type-approved for different diesel fuel blends