1. General

In this publication, the Central Bureau of Statistics (CBS) presents annual data on motor vehicles in Israel, updated for the end of 2022. The data include information on the type of vehicle, manufacturer, country of production, year of first use, place of registration, type of ownership, type of propulsion (including hybrid and electric), number of changes in ownership, detailed information on the vehicle's safety systems, number of airbags, pollution levels, engine power (horsepower), color, type of gear box and more.

The CBS data are based on an administrative file that is received monthly from the Vehicle Licensing Department of the Ministry of Transport and Road Safety. Some of the information on motor vehicle characteristics is obtained from the "Models File" of Private and Commercial Vehicles of the Ministry of Transport and Road Safety.

The publication is divided into chapters according to the type of vehicle and includes tables presenting comparisons with data from previous years and comparisons with data from selected countries. The tables also present data on hauled vehicles (which are not motor vehicles), as well as data on vehicles involved in road accidents with casualties.

The publication also includes tables that display details on emissions of air pollutants by motor vehicles and their concentrations.

2. Main Findings

At the end of 2022, there were 3,923,311 **motor vehicles in Israel** (Tables 1, 2) – a 3.5% increase compared to the end of 2021. This is a decrease in the annual growth rate compared to the end of 2021 (4.1%). The growth rate in the number of private cars was 3.6% in 2022. Here, also, there was a decrease in the annual growth rate (4.4% in 2021).

Of the total number of vehicles, there were 3,433,026 private cars, 308,158 trucks (of which 123,416 trucks over 3.5 tons), 163,680 motorcycles, 22,413 taxis, 23,999 buses, 15,295 minibuses and 6,740 special vehicles.

The average age of motor vehicles at the end of 2022 was 7.4 years (Table 3). Examination of data for the past 20 years shows that the average age of private cars increased from 6.4 years in 2000 to 7.2 years in 2006 and then decreased, reaching 6.6 years in 2017. Since 2018, it has increased again, reaching 7.2 years in 2022.

The average age of trucks up to 3.5 tons steadily increased from 5.0 years in 2000 to 11.4 years in 2020, and remained unchanged in both 2021 and 2022. The average

age of trucks over 3.5 tons increased slightly from 5.9 years in 2000 to 6.3 years in 2021 and remained unchanged in 2022.

In 2022, 1,444,950 motor vehicles (36.4% of all motor vehicles) were up to 4 years old (year of first use 2018–2022), 1,269,060 (31.9%) were 5–9 years old, and 1,259,300 (31.7%) were 10 years old and over.

Country of Production and Manufacturer

22.5% of motor vehicles in use in Israel at the end of 2022, were manufactured in **Japan** (by Mazda, Subaru, Mitsubishi, Toyota, Suzuki and Honda), which maintained its rank as the main country of production from which motor vehicles are imported to Israel. In second place was **South Korea** with 15.0% (by Hyundai, Kia, Daewoo and Chevrolet). Third place was **Czech Republic** with 8.0% (by Skoda, Hyundai, Toyota and Seat) and fourth place was **Turkey** with 6.9% (by Toyota, Renault and Honda) (Table A). China's market share has increased 3-fold between 2019 and 2022 (from 0.5% to 1.5%, respectively).

Table A. Motor Vehicles in Israel, by Country of Production, 2018–2022

Percentages, unless otherwise stated

Country of Production	2022	2021	2020	2019	2018
Absolute numbers	**3,973,311**	**3,840,104**	**3,689,299**	**3,600,649**	**3,495,412**
Percentages	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Japan	**22.5**	23.4	24.5	25.3	26.4
South Korea	**15.0**	14.6	14.2	14.1	14.0
Czech Republic	**8.0**	7.9	7.6	7.3	6.8
Turkey	**6.9**	7.0	6.9	6.8	6.5
Germany	**6.2**	6.4	6.6	6.7	6.9
Spain	**6.0**	6.1	6.2	6.3	6.5
Taiwan	**4.7**	4.8	4.7	4.7	4.5
France	**4.3**	4.3	4.4	4.5	4.6
United Kingdom	**4.2**	4.3	4.3	4.2	4.1
Thailand	**3.4**	3.1	3.0	2.9	2.8
Slovakia	**3.0**	3.0	2.8	2.7	2.5
United States	**2.8**	2.8	2.6	2.6	2.6
Hungary	**2.3**	2.2	2.1	2.1	2.0
India	**2.2**	2.2	2.3	2.3	2.2
Mexico	**1.5**	1.5	1.5	1.5	1.4
China	**1.5**	0.8	0.5	0.5	0.4
Italy	**1.3**	1.3	1.4	1.4	1.5
Other and Not known	**4.2**	4.3	4.4	4.1	4.3

During 2022, 379,915 vehicles were added, of which 312,482 were new (Table 43).[1] During that same period, 246,708 vehicles were subtracted. Thus, the **net** increase in the number of vehicles in Israel amounted to about 133,207 vehicles (possible reasons for subtractions are: dismantlement, total loss, dealer deposit, etc.).

Of the 312,482 **private cars** that were added in 2022, 259,636 (83.1%) were **private cars** produced by the manufacturers listed in Table B.

Table B. New Private Cars Added to the Number of Vehicles, by Manufacturer, 2018–2022

Percentages, unless otherwise stated

Manufacturer	2022	2021	2020	2019	2018
Total in absolute numbers	**259,636**	**282,852**	**210,849**	**246,363**	**257,162**
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Hyundai	16.6	15.4	15.8	16.2	14.8
Kia	14.4	14.0	12.0	12.9	13.8
Toyota	13.0	14.7	14.6	15.4	10.4
Mazda	7.2	5.3	4.4	4.4	5.1
Skoda	5.0	6.8	8.5	7.3	7.7
Mitsubishi	4.0	3.8	5.7	5.5	4.8
Suzuki	3.3	3.7	3.6	3.9	4.2
Seat	3.2	4.5	4.9	3.7	3.5
Geely	2.6	0.1	-	-	-
Tesla	2.2	2.2	-	-	-
Mercedes	2.1	1.7	1.5	1.2	1.3
Peugeot	2.1	2.6	2.6	2.7	2.4
Saic	2.0	1.0	0.7	0.4	0.2
Chevrolet	1.8	3.0	3.2	2.4	2.6
BMW	1.8	1.5	1.3	1.5	1.6
Citroen	1.7	1.2	1.5	1.4	1.5
Subaru	1.7	1.9	1.8	1.8	2.2
Nisan	1.4	4.0	3.6	4.5	6.3
BYD	1.4	-	-	-	-
Renault	1.3	2.4	3.3	3.5	4.2
Other and not known	11.2	10.2	11.0	11.3	13.4

[1] There are used cars that were added to the number of vehicles in Israel, such as: military cars or police cars that became civilian vehicles, etc.

Of all private cars that were added in 2022, 44.0% were manufactured by three companies: Hyundai, Kia and Toyota (44.1% in 2021). Hyundai, whose share in 2022 was 16.6% (15.4% in 2021), was the leading company during 2018–2021 as well. Kia was in second place with a 14.4% market share (14.0% in 2021). In third place was Toyota, whose share in 2022 was 13.0% (14.7% in 2021).

Engine power (horsepower – hp) (Table 26)**:** Of all **private cars** at the end of 2022, 22.8% were 51–100 hp (25.5% in 2021), 7.7% were 101–120 hp (10.1% in 2021), 13.4% were 121–140 hp (13.0% in 2021) and 18.9% were 141–160 hp (24.3% in 2021).

Table C. Vehicles, by Type of Vehicle and Type of propulsion, 2022

Absolute numbers

Type of propulsion	Total	Gasoline	Diesel	Hybrid	Gas	Electric
Grand total	**3,973,311**	**2,991,924**	**551,160**	**362,971**	**21,986**	**45,270**
Private car	**3,433,026**	2,813,039	203,170	356,050	18,959	41,808
Trucks – Total	**308,158**	17,357	288,078	2	2,574	147
up to 3.5 tons	**184,742**	16,912	165,271	2	2,441	116
over 3.5 tons	**123,416**	445	122,807	-	133	31
Minibus	**15,295**	6	15,273	-	-	16
Bus	**23,999**	1	22,974	-	431	593
Taxi	**22,413**	262	15,112	6,919	20	100
Special vehicle	**6,740**	185	6,553	-	2	-
Motorcycle	**163,680**	161,074	-	-	-	2,606

Type of propulsion (Table 12)**:** In 2022, 75.3% of all motor vehicles were **gasoline-powered** vehicles. Since 2015, there has been a decrease in the percentage of gasoline-powered vehicles out of the total number of vehicles.

In 2022, there were 551,160 **diesel-powered** vehicles – 13.9% of all motor vehicles. The percentage of private cars powered by diesel was 5.9% (increasing from 2.9% in 2011 to 5.9% in 2021 and remaining unchanged in 2022). There were 203,170 diesel powered private cars (197,020 in 2021). 67.4% of all taxis were diesel-powered, almost all trucks over 3.5 tons were diesel-powered (99.5%), as well as 89.5% of trucks up to 3.5 tons.

The number of **gas-powered** vehicles in 2022 is similar to their number in 2021 – 21,986, of which 18,959 were private cars.

The number of **electric-powered** vehicles have constantly increased from 1,498 in 2017 to 45,270 in 2022, of which 41,808 were private cars. In 2022, there has been

an increase of almost 2.8 times in the number of private electric-powered cars (16,251 in 2021). In 2022 there were 2,606 electric-powered motorcycles (2,127 in 2021) and 593 electric-powered buses (141 in 2021).

In 2022, there were 362,971 **hybrid**[2] vehicles (including standard hybrid and plug-in hybrid) compared to 299,644 in 2021 – an increase of 21.1%.

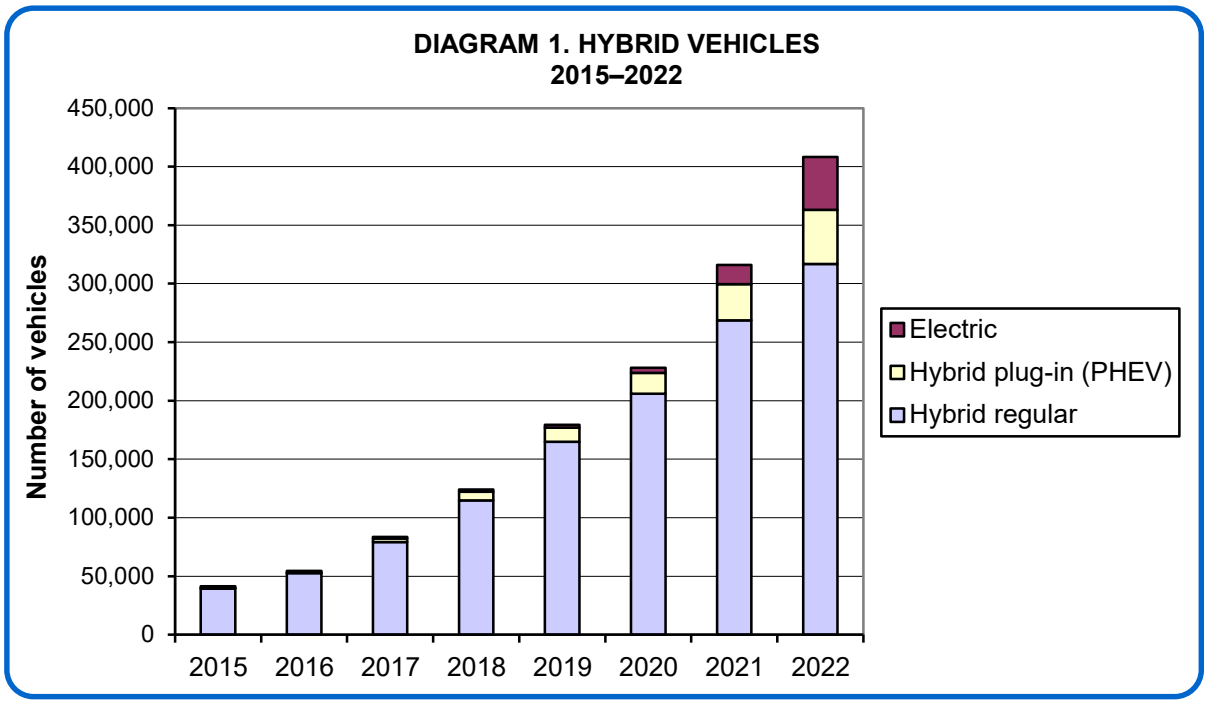
46,262 hybrid vehicles were of the plug-in type and the rest were regular hybrid (Table D). The majority of hybrid vehicles were private cars. The number of hybrid-powered taxis continued to increase and reached 6,919 (4,315 in 2021 – an increase of 60%).

Table D. Hybrid Vehicles: Private Cars and Taxis, 2018–2022

Absolute numbers

Type of Vehicle	2022	2021	2020	2019	2018
Hybrid Vehicles – total	**362,971**	**299,644**	**223,666**	**176,834**	**122,268**
Private cars	**356,050**	**295,329**	**221,662**	**175,192**	**121,542**
Hybrid – regular	309,863	264,313	204,052	163,260	114,163
Hybrid – plug-in	46,187	31,016	17,610	11,932	7,379
Taxis	**6,919**	**4,315**	**2,004**	**1,642**	**726**
Hybrid – regular	6,844	4,270	1,997	1,639	723
Hybrid – plug-in	75	45	7	3	3

[2] A petroleum-electric vehicle using a combination of internal combustion engines (generally gasoline) and electric motors to power the vehicle. See Chapter 3 – Terms, Definitions and Explanations.



Electric motor vehicles across cities/councils/districts

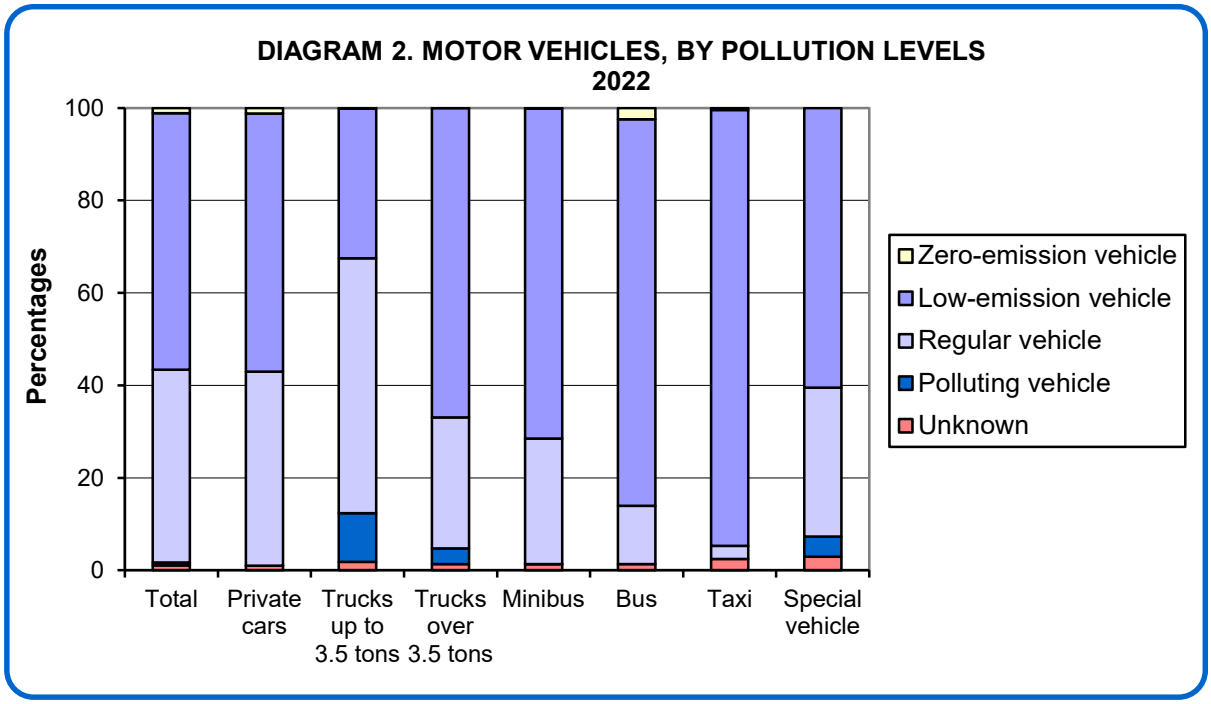
The three cities with the highest number of electric vehicles are: Tel Aviv-Yafo (4,619), Rishon LeZiyyon (2,108) and Jerusalem (1,539) (Table 8b). Among the local councils, Bene Ayish (399) (Table 9b). And among the regional councils Matte Yehuda (507) (Table 10b). The district with the highest number of electric motor vehicles is Central District (16,277) and below it is Tel Aviv District (9,320) (Table 11b).

Type of ownership (Table 20)**:** In 2022, 88.7% of all private cars were privately owned (same as in 2021), and 11.3% were under other ownership: 6.6% were owned by leasing companies, 3.7% were owned by companies (not including self-employed persons) and 1.0% were cars for rental or touring. It should be noted that most of the private cars that were not privately owned were new cars up to 3 years old.

Of the total number of **private cars whose year of first use was 2022**, 65.4% were privately owned (61.7% in 2021) and 34.6% were under other ownership (38.3% in 2021): 22.1% were owned by leasing companies (24.2% in 2021), 9.0% were owned by companies (not including self-employed persons) (9.6% in 2021) and 3.5% were cars for rental or touring (4.4% in 2021).

As of 2018, the Ministry of Transport and Road Safety has rated motor vehicles by **level of air pollution** (excluding motorcycles). The rating is determined based on the air pollution emission standard with which the vehicle complies and appears on the vehicle license as one of the following levels: polluting vehicle, regular vehicle, low-emission vehicle, or zero-emission vehicle (see Chapter 3: Terms, Definitions and

Explanations). Diagram 2 shows the distribution of pollution levels by type of vehicle; 55.8% of the private cars had a low-emission rating (51.7% in 2021). The pollution level of the vehicles has changed over the years (Table 25). Most vehicles whose year of first use was until 2014 were regular vehicles. As of 2015, most vehicles are low-emission vehicles (99.3% in 2015 and 89.0% in 2022). From 2021 the percentage of zero-emission vehicle is on a significant upward trend (4.0% in 2021 and 10.8% in 2022).



Changes of ownership and transactions (Tables 13, 14)**:** Of all private cars in the 2022 fleet, 34.4% never changed ownership (i.e., they were still in the hands of the original owners), 31.9% changed ownership once, 16.8% changed ownership twice and 8.3% changed ownership three times. 37.9% of three-year-old private cars changed ownership once (year of first use 2019), compared with 18.4% of two-year-old private cars (year of first use 2020).

During 2022, 617,033 vehicles changed ownership, of those, 522,138 were private cars (15.2% of the total number of private cars), 38,536 were motorcycles (23.5% of total motorcycles), 30,550 were trucks up to 3.5 tons (16.5% of total trucks up to 3.5 tons) and 5,381 were taxis (24.0% of total taxis) (Table 14).

Private cars with automatic transmission (Table 28): The percentage of private cars with automatic transmission increase over the years: 99.3% of private cars whose year of first use was 2022 had automatic transmissions, compared to 93.3% of the private cars whose year of first use was 2015.

Tariff type: In 2022 there were 14,174 **collector's vehicles**, of which 10,174 were private cars, 1,642 were trucks and 2,190 were motorcycles. There were 6,982

vehicles belonging to **driving schools** on the roads, of which 5,745 were private cars, 378 were trucks and 704 were motorcycles.

The most prevalent **color** (Table 27) of private cars **on the roads in Israel** at the end of 2022 was white (including ivory) – 35.9% of all private cars, followed closely by grey and its various shades (light grey, dark grey, silver) – 35.8%. Among the private cars **whose year of first use was 2022**, white was the most prevalent color – 46.2%, with grey in second place – 30.2%.

Safety Systems in Private Cars[3] (Tables 23, 24)

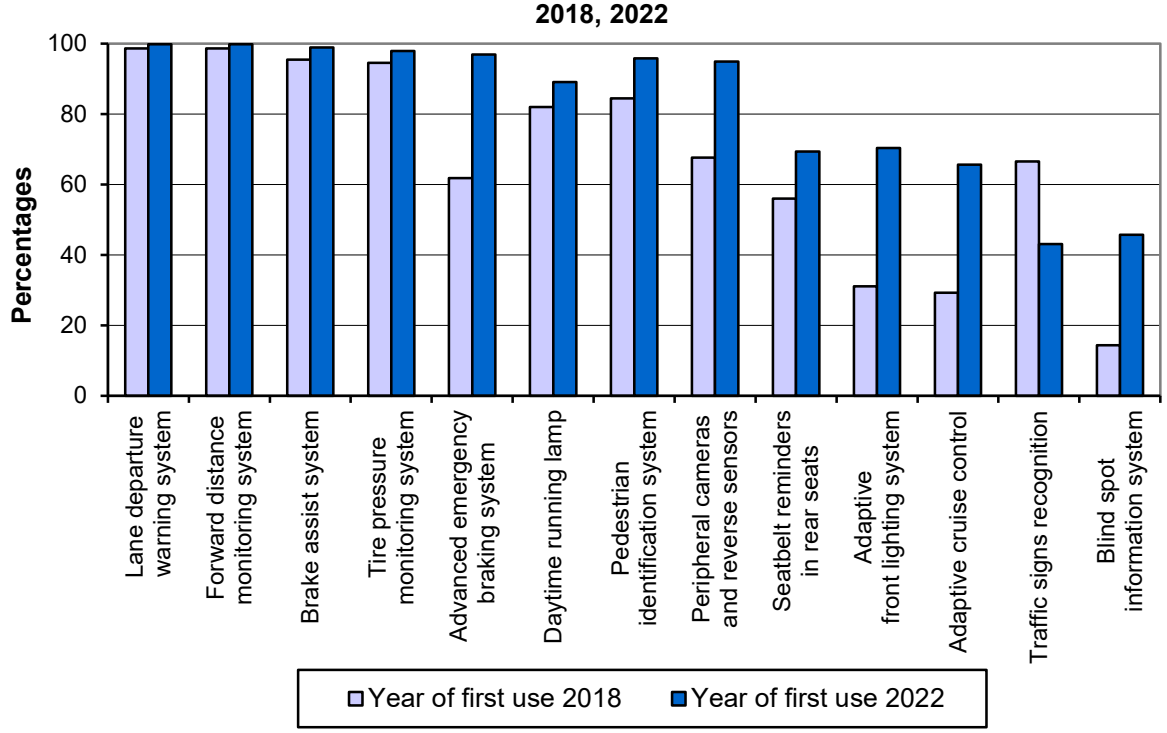
The newer the vehicle, the more safety systems are installed in it. Almost all private cars whose **year of first use was 2022** (99.8%) have a lane departure warning system and a forward distance monitoring system, as these systems have become compulsory for all cars imported since January 2018. Other safety systems also have relatively high installation rates: brake assist systems (98.9% of private cars with year of first use 2022), tire pressure monitoring systems (97.9%), advanced emergency braking systems (AEBS) (96.9%), pedestrian identification systems (95.8%), peripheral cameras and reverse sensors (94.9%).

Additional safety systems installed in private cars first used in 2022 are: daytime running lamps (89.1%), adaptive front lighting systems (70.4%), seatbelt reminders in rear seats (69.3%), adaptive cruise controls (65.6%), blind spot information systems (45.7%) and traffic signs recognition (43.1%).

Diagram 3 shows a comparison of safety systems installed in private cars whose year of first use was 2022 compared with 4-year-old cars (year of first use 2018).

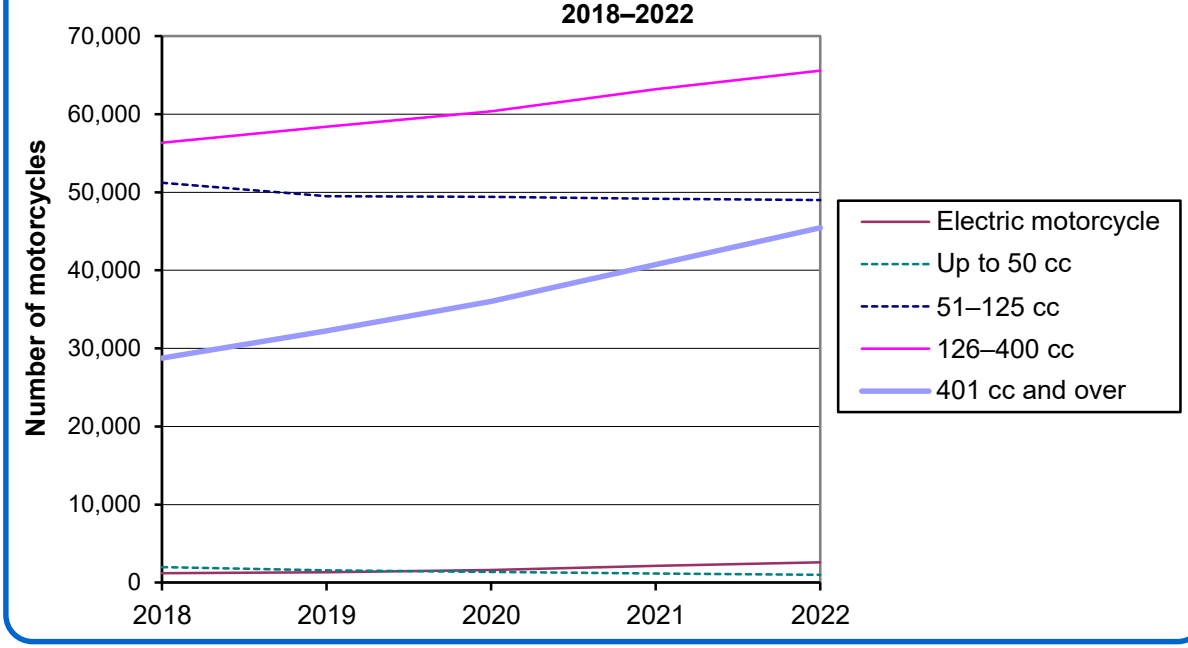
[3] The data include safety systems reported to the Licensing Bureau. There are other systems that are not reported to the Licensing Bureau.

DIAGRAM 3. SAFETY SYSTEMS IN PRIVATE CARS, BY YEAR OF FIRST USE 2018, 2022



Motorcycles (Tables 32, 33)**:** As can be seen in diagram 4, there is a constant decrease in the number of motorcycles with an engine volume of up to 50 cc (1,999 in 2018 and only 994 in 2022). At the same time, the number of electric powered motorcycles and those with an engine volume of 126–400 cc and 401 cc and over are constantly increasing.

DIAGRAM 4. MOTORCYCLES, BY ENGINE CAPACITY AND YEAR 2018–2022



In 2022, the **rate of motorization in Israel** increased – 411 vehicles per 1,000 residents (compared with 406 vehicles per 1,000 residents at the end of 2021). Of these, 355 were private cars.

Diagram 5 presents the increase in the rate of motorization in Israel throughout the years 2000–2022.

Diagram 6 presents a comparison between countries for the last year for which data are available in international publications.

DIAGRAM 5. MOTORIZATION RATE IN ISRAEL – PRIVATE CARS AND TOTAL NUMBER OF VEHICLES 2000–2022

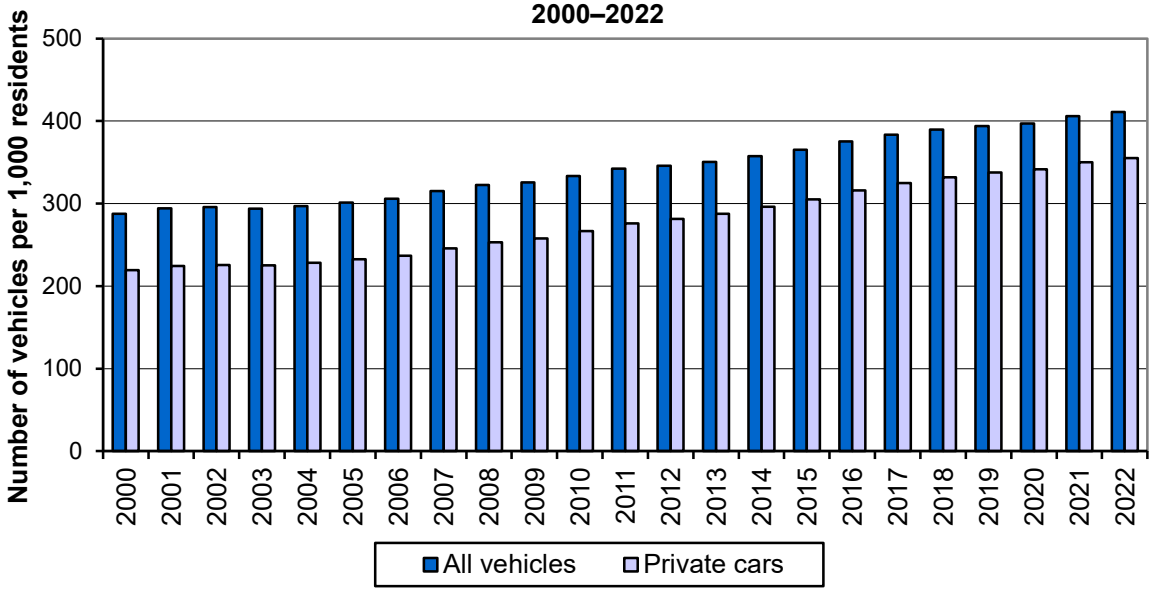
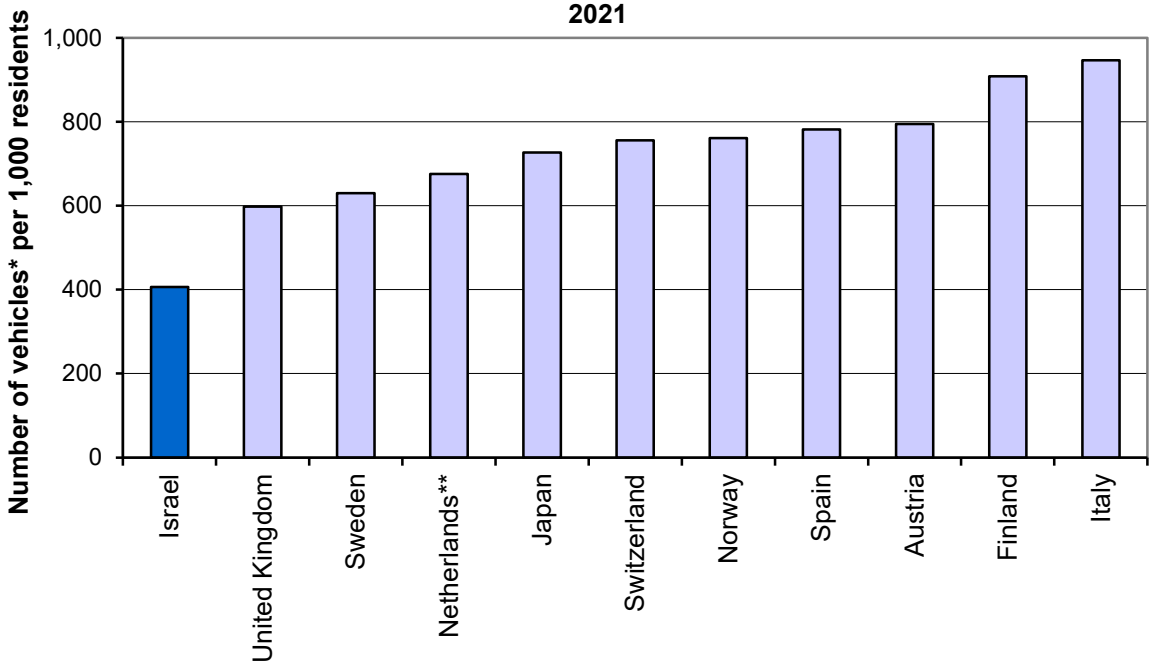


DIAGRAM 6. RATE OF MOTORIZATION IN ISRAEL AND IN SELECTED OECD COUNTRIES 2021



* Including motorcycles.
** Datum for 2020.
Source: IRTAD, International group for road safety.

Rate of Involvement of Vehicles in Road Accidents With Casualties per 1,000 Licensed Vehicles

Table E. Involvement of Vehicles in Road Accidents With Casualties (R.A. Type Expanded File)(1), by Type of Vehicle, 2017–2022

Rate per 1,000 licensed vehicles (out of the total vehicles of the same type)

Type of vehicle	2022	2021	2020	2019	2018	2017
Total	**4.7**	**5.5**	**5.3**	**5.9**	**6.0**	**6.8**
Private car	**3.6**	4.2	4.1	5.1	5.2	5.8
Truck up to 3.5 tons	**4.3**	4.6	4.6	5.6	5.6	6.1
Truck over 3.5 Total	**5.3**	6.1	6.1	7.1	7.1	8.1
Thereof: 34.0+ tons	**6.5**	7.7	7.6	10.9	11.2	11.0
Minibus	**8.9**	10.5	8.1	12.5	12.5	14.9
Bus	**23.8**	23.8	23.2	28.3	26.8	29.2
Taxi	**18.9**	22.2	21.1	26.1	27.8	33.2
Special vehicle	**2.7**	3.1	2.8	2.8	2.4	3.9
Motorcycle	**13.0**	14.7	15.1	15.5	16.3	18.3

(1) Incl. accidents that occurred in the Judea and Samaria Area.

The rate of involvement of vehicles in road accidents with casualties that were investigated by the police (per 1,000 vehicles) has decreased over the years (Table 47). In 2022, 4.7 of every 1,000 vehicles were involved in accidents with casualties (6.8 in 2017). In 2022, 3.6 out of every 1,000 private cars were involved in accidents with casualties; 6.5 out of every 1,000 trucks with a gross weight of 34 tons or more, and 23.8 out of every 1,000 buses. The rates of involvement of vehicles in road accidents with casualties differ among the different types of vehicles. The rate of involvement of public transport vehicles (minibuses, buses and taxis) and of trucks weighing 34 tons or more (gross weight) in accidents with casualties was the highest (it should be noted that these vehicles have high annual kilometers travelled). Motorcycles also have a high rate of involvement in accidents with casualties, even though their annual kilometers travelled are low.

Air pollution from transportation (Tables 48, 49)**: Carbon monoxide (CO)** is emitted from vehicles as a result of incomplete combustion of fuels. Most of the carbon monoxide (CO) emissions (86.3%) result from motor vehicle transportation. Data from the transportation monitoring stations, as reported by the Ministry of Environmental Protection, indicate that from the start of monitoring until the end of 2021, there were no deviations from the environmental standard values for CO.

Gasoline-powered vehicles were the source of 87.1% of total **hydrocarbon (HC)** emissions from transportation.

Vehicles accounted for 33.1% of total **nitrogen oxide (NO_X)** emissions and most of these emissions (87.0%) were from diesel-powered vehicles. In 2021, no deviations were detected at all of the transportation monitoring stations.

The percentage of **suspended particulate matter (SPM)** emissions from transportation out of total emissions was 16.5%. Most of the SPM emissions from transportation (71.8%) were from diesel-powered vehicles.

The percentage of **sulfur dioxide (SO_2)** emissions from transportation was small (0.5%). These emissions have decreased significantly over the years due to a change in the standard for sulfur content in fuels.

3. Terms, Definitions and Explanations

Motor vehicle: A land road vehicle that runs on mechanical power and that is designed for carrying persons or freight or for hauling a trailer (excluding land motor vehicles running on rails).

Year of first use: The year in which the vehicle was first used on the highway, even if it was not yet registered in the Civilian Motor Vehicle Registry of the Ministry of Transport and Road Safety.

Note:

In April 2008, the Ministry of Transport and Road Safety transitioned from using "year of production" to using "year of first use". The production year is not identical to the calendar year. Usually, the production year begins in the last third of the previous calendar year and ends after approximately two-thirds of a year. As a result, data on "year of first use 2008" include vehicles with a production year of 2008 that were first used at the end of 2007, as well as vehicles that were first used throughout 2008, i.e., vehicles that were first used within a period of a year and four months. As of 2009, data appear according to "year of first use" (which has replaced "year of production") and is identical to the calendar year.

Year of vehicle registration: The year in which the vehicle was first registered in the Civilian Motor Vehicle Registry of the Ministry of Transport and Road Safety, with its current license number.

Note:

Examples of vehicles for which the year of first use is different than the year of vehicle registration: Military vehicles or police vehicles that became civilian cars – the year of first use is earlier than the year of vehicle registration; taxis that became private cars – for a private car, the year of first use is the year the vehicle was first used as a taxi, however, the year of vehicle registration for that vehicle is the year it was registered as a private car; vehicle of a new immigrant – the year of first use is the year the vehicle was first used in the country of origin, but the year of vehicle registration is the year the vehicle was registered in the Civilian Motor Vehicle Registry in Israel.

Truck (including "commercial vehicle"): A Motor vehicle designed to carry goods. As of 1978, excludes dual-purpose vehicles (which were transferred to the category of private cars). As of 1993, excludes minibuses (which were defined as a separate type of vehicle). As of 1996, excludes special trucks for passengers (which were transferred to the category of buses).

Gross weight: The weight of the vehicle plus the weight of the passengers and load carried by it, as permitted by the Vehicle Licensing Authority for that vehicle.

Two main types of trucks are distinguished by gross weight:

a. **Truck up to 3.5 tons ("commercial vehicle")** (until 2007 – up to 4.0 tons)

   1. **Van:** A truck with a closed back, without separation between the driver's cab and the back load unit. As of 1993, this type does not include "minibus" (see definition and explanation below).
   2. **Pick-up:** A truck with separation between the driver's cab and the back load unit (open or closed).

b. **Truck over 3.5 tons** (until 2007 – over 4.0 tons)

   1. **Ordinary truck:** A truck with the back open permanently.
   2. **Closed truck:** A truck with the back closed permanently.
   3. **Tip-lorry:** A truck for transport of freight that tips up mechanically in order to unload the freight.
   4. **Tanker:** A vehicle used or designed for use in the transport of liquids, cement in bulk, or gas.
   5. **Road tractor:** A motor vehicle designed to haul a semi-trailer and/or a trailer.

Hauled vehicle:

a. **Trailer:** A road vehicle for the transport of goods, which is hauled by a road tractor.

b. **Semi-trailer:** A road vehicle for the transport of goods, which has no front axle and is designed in such a way that part of the vehicle and a substantial part of its loaded weight rests on a road tractor.

Load capacity: Maximum weight of goods officially permitted by the Licensing Authority.

Bus: A motor vehicle which is designed to carry more than 9 persons (including the driver) and is described in its licence as a bus. A bus can carry seated as well as standing passengers. Excluding a minibus, which is a unique type of bus existing in Israel, licenced to carry up to 20 persons (including the driver).

Minibus: A motor vehicle of up to 5 tons gross weight, licenced to transport up to 20 persons (including the driver) and described in its licence as a minibus. The distinction between bus and minibus is unique to Israel. Until 2016, the maximum number of passengers permitted in a minibus (including the driver) was 17.

Until 1992, a minibus was included under "Truck up to 4 tons – van" (i.e., without separation between the passengers and the back load).

Taxi: A public motor vehicle which is designed to transport up to 11 persons (including the driver) and is described in its licence as a taxi. Changes have occurred in the maximum number of passengers permitted (including the driver): Up to February 1993 – 8 passengers; from March 1993 to December 1997 – 9 passengers; and as of January 1998 – 11 passengers.

Private car: A motor vehicle that is not a public service vehicle or a commercial vehicle or a two-wheeled vehicle and that is designed to transport up to 9 passengers (including the driver).

Passenger vehicle: A motor vehicle intended to transport up to 9 persons (including the driver). Includes private cars, taxis and minibuses. Excludes motor scooter and motorcycles.

Special vehicle: A motor vehicle designed for special services: ambulance, rescue vehicle, fire brigade vehicle, vehicle for work tools.

Motorcycle: A motor vehicle with two or three wheels, described in its license as a motorcycle, including tricycles and motorcycles with sidecars.

As of 1992, the Vehicle Licensing Authority has stopped classifying motorcycles by type (scooter, motor scooter, motorcycle, etc.) and instead classifies only by engine capacity (in cc). This classification refers to the following main types of motorcycles:

Until 2006:

a. Up to 50 cc (corresponds to "scooter" or "motor bicycle" according to the previous classification);

b. 51–250 cc;

c. 251–500 cc;

d. Over 500 cc.

As of 2007:

a. Up to 125 cc.

b. 126–400 cc.

c. Over 400 cc.

The data is presented in this publication according to the new main types as well as by sub-types, in order to enable comparison with the previous classification.

Type of ownership: Determined by the licensed owner of the vehicle. There are four types of ownership: private; leasing company; company (not including self-employed persons) and rental or touring.

Rate of motorization: The number of motor vehicles per 1,000 residents (permanent residents at the end of the year).

Locality (address) of the vehicle owner: It should be emphasized that the data in this publication are classified according to the registered locality (address) of the owner of the vehicle and not according to the place of residence of the actual user of the vehicle, nor according to the locality in which the vehicle is used. Thus, for example, Tel Aviv-Yafo has a large number of vehicles listed, because state vehicles and vehicles owned by various companies are registered there, even though these vehicles are not necessarily used in the Tel Aviv-Yafo area. This problem exists in other localities as well. When enterprises owning large fleets of vehicles change the registered address of their fleet in a given year, there is a large increase in the number of vehicles listed in the new locality (compared with the previous year) and a

large decrease in the number of vehicles listed in the old locality compared with the previous year. Yet, these changes do not reflect any change in the number of vehicles actually available to the residents of these localities.

Additions: Vehicles that were included in the motor vehicles fleet (as defined above) for the year of the data, but not in the vehicles fleet for the previous year.

Subtractions: Vehicles that were included in the motor vehicles fleet for the previous year, but not for the year of the data.

Vehicles supplied to the local market: The definitions of "vehicles supplied to the local market" that appear in the *Transport Statistics Quarterly* and in the *Monthly Bulletin of Statistics* differ slightly from the definition of "private car" presented for the number of motor vehicles. Therefore, when comparing the data, the following differences in these definitions should be noted:

a. According to the definition in the two above-mentioned publications, vehicles supplied to the local market are registered when they leave the factory, or when they are imported and released from the port. However, these vehicles appear in the motor vehicles fleet only when they are registered at the Vehicle Licensing Department.

b. The term "vehicles supplied to the local market", by definition, does not include vehicles that were taken off the road and whose licenses were renewed during the year of the data.

c. The term "vehicles supplied to the local market" also includes security vehicles and vehicles sold to the Palestinian Authority.

Type of propulsion:

Gas: Includes CNG and LPG.

Hybrid vehicle: Refers to petroleum-electric hybrid vehicle using a combination of internal combustion engines (generally gasoline) and electric motors to power the vehicle. The energy is stored in the fuel of the internal combustion engine and an electric battery set. The combination of motors enables maximum use of fuel and minimal transportation costs and air pollution due to motor vehicles.

Plug-in hybrid electric vehicle (**PHEV**): A fuel-electric hybrid vehicle with increased electrical energy storage capacity, which allows the vehicle to drive on all-electric mode for a distance that depends on the battery size and its mechanical layout (30 to 50 km). The vehicle is charged by connecting the vehicle's battery pack to a home or public quick charging station.

Electric vehicle: A vehicle driven by one or more electric motors, using energy stored in rechargeable batteries. Compared to vehicles with internal combustion engines, electric vehicles are quieter, with high efficiency, no gas emissions, and in general their emissions are lower. The vehicle is charged by connecting the vehicle's battery pack to a home or public charging station.

Safety systems:

The Ministry of Transport and Road Safety and the Tax Authority decided to provide tax incentives for vehicles equipped with safety systems, with the aim of encouraging the import and purchase of better equipped and safer vehicles. Each vehicle model is accorded a safety level, which appears on the vehicle licence. The better equipped the vehicle is with safety features, the higher the safety level accorded. This is in accordance with Statute 270D of the Transport Statutes and in accordance with the Ordinance on Tariff and Purchase Tax Rates for Goods.[4] The safety systems defined in this statute are as follows:

Airbag: A safety device designed to minimize damage to the driver and passengers as a result of a road accident. The airbag inflates with compressed gas when an accident occurs, thereby absorbing a part of the energy generated during the

[4] Safety systems in vehicles of the M1 and N1 types, Ministry of Transport and Road Safety.

accident, protecting against broken parts and glass slivers and reducing the damage sustained by the vehicle occupants.

Lane Departure Warning System: A system that alerts the driver of drifting out of his driving lane by means of at least two of the following types of warnings: visual (mandatory), acoustic and haptic. Additionally, the system may include an active lane warning departure system, which rigidizes the steering wheel, thereby preventing or minimizing the unwanted drift.

Forward Distance Monitoring System: A system that identifies an obstacle in front or a situation where the driver fails to maintain a proper distance from the vehicle in front (not in order to park) and alerts the driver of the danger of collision through a sonic alarm (mandatory) and a visual alert. Additionally, the system may include an active system, which initiates automatic braking when a danger of imminent collision has been identified.

Blind spot Information System: A system that identifies the presence of vehicles in "blind spots" along the sides of the vehicle, using peripheral cameras and reverse sensors located on the rear side walls of the vehicle and generates a visual alert on the appropriate side mirror or close to it, within the vehicle driver's field of vision.

Adaptive Cruise Control: A system designed to maintain a steady driving speed while maintaining a safe distance from the vehicle in front, through automatic control of the throttle and brakes. The system slows the vehicle down when it gets close to a vehicle in front of it and increases the speed when the traffic flow allows this.

Pedestrian Identification System: A system that identifies pedestrians crossing or standing on the road in front of the vehicle while the vehicle travels forward and alerts the driver of the danger of hitting the pedestrian through a sonic alarm (mandatory) or a visual alert. This system may also include an active system that brakes the vehicle in the event of an acute danger of hitting a pedestrian.

Rear View Camera: A system of rear view (reverse) cameras installed in the rear part of the vehicle that enable panoramic viewing, from the driver's seat, of the area located behind the vehicle when it travels backwards.

Seatbelt Sensors: A system that identifies and alerts (through a sonic and/or visual alarm) of the presence of unbelted occupants in the front and rear seats, whenever the vehicle is in motion.

AEBS – Advanced Emergency Braking System: A system capable of identifying a situation of a dangerous approach to obstacles and issuing a sonic alert. In the event

of an imminent danger of an accident, if the driver fails to remedy the situation, the system will initiate braking of the vehicle.

Traffic Sign Identification System: A system capable of identifying standard and electronic road speed limit signs and issuing an alert when the speed limit has been exceeded.

Bicycle Rider and Motorbike Identification System: A system that identifies bicycle riders or motorbikes crossing or moving on the road in front of or alongside the vehicle while the vehicle travels forward and alerts the driver of the danger of hitting the bicycle or motorbike through a sonic alarm (mandatory) or a visual alert. This system may also include an active system that brakes the vehicle in the event of an acute danger of hitting a bicycle or motorbike rider.

The data in this publication include local installation of safety features that the Ministry of Transport and Road Safety records (this refers to the Lane Departure Warning System and the Forward Distance Monitoring System).

The procedure for calculating the **Safety Equipment Level**[5] defines scores of 0–8, in which 0 is the lowest and 8 is the highest. Each system installed in a vehicle receives a different weight in the score, according to the system installations that the Ministry of Transport and Road Safety is interested in encouraging. The procedure is updated every few years, and therefore it is difficult to compare vehicles of different years of first use.

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[5] Safety systems in vehicles of the M1 and N1 types, Ministry of Transport and Road Safety.

Pollution Level for Vehicles

Since 2018, the Ministry of Transport and Road Safety has rated motor vehicles by level of air pollution (excluding motorcycles). The rating is determined based on the air pollution emission standard with which the vehicle complies and appears on the vehicle license as one of the following:

1. **Polluting vehicle:** Old diesel vehicles (except private cars). These vehicles are marked by the Licensing Bureau with a sticker on the front window. These vehicles are not allowed to enter certain areas in Haifa and downtown Jerusalem, according to city regulations.
2. **Regular vehicle:** Included are gasoline and diesel vehicles that do not pass the most updated emission standards, but do pass the standards of the past few years. Today (2022) there are no limitations on these vehicles in Israel, but driving them in some large cities abroad (for example, the center of London) is prohibited. It is possible that in the future travel limitations will be applied to them in Israel as well.
3. **Low-emission vehicle:** Meets the advanced emission standard or has a particles filter installed.
4. **Zero-emission vehicle:** Vehicle does not directly emit any pollution (such as electric powered). These vehicles have no travel restrictions based on air pollution considerations.

Carbon Dioxide (CO_2): A greenhouse gas originating from the combustion of material that contains carbon.

Carbon Monoxide (CO): A colorless, odorless and poisonous gas produced by incomplete fossil fuel combustion. Carbon monoxide combines with the hemoglobin in the blood, reducing its oxygen carrying capacity, with harmful effects. Carbon monoxide is a greenhouse gas precursor.

Sulfur Dioxide (SO_2): A heavy, pungent, colorless gas formed primarily by the combustion of fossil fuels. It is harmful to human beings, animals and vegetation and contributes to the acidity in precipitation. Sulfur dioxide is a greenhouse gas precursor, but it also acts to cool the earth.

Nitrogen Oxides (NO_X): Acidic gases emitted primarily by power stations, manufacturing plants and motor vehicles (mainly from diesel engines).

Hydrocarbons (HC): Compounds of hydrogen and carbon in various combinations that are present in petroleum products and natural gas.

Suspended Particulate Matter (SPM): Finely divided solids or liquids that may be dispersed through the air from combustion processes, industrial activities, or natural sources. The most hazardous particles are those that are less than 10 microns in size, which can penetrate the respiratory system. They derive mainly from natural sources and include fractions of small particles that are smaller than 2.5 microns (fine suspended particulate matter – PM2.5). Industries, transport and home heating usually emit these particles.

Lead (Pb): A highly poisonous heavy metal, used for years in additives to petrol, paints and plumbing.

Unleaded gasoline: Over the years, the Israeli economy has switched to the use of unleaded gasoline. Cars that use unleaded gasoline still pollute the air with lead, but to a significantly lesser extent. In Israel, as in other developed countries, cars produced as of 1993 are required by law to have catalytic converters installed, so that they can use only unleaded gasoline.

Environmental standard value/Air Quality: The threshold concentration of a given pollutant allowed in the air inhaled by humans at a given time.

Maximum value for half-hour/8 hours/24 hours: The maximum half-hour/8 hours/24 hours (respectively) value recorded during the year.

Transportation monitoring stations: Stations that monitor air pollutants originating in motor vehicles and that are located next to major highways. Measurement is carried out at the level of the motor vehicle's height and represents the quality of local air that is actually breathed by people who cross or remain near major highways. In these stations, special monitors continuously and automatically measure air pollutants that are characteristic of emissions from vehicles. These data are stored temporarily at the station. Every five minutes, the averages are transmitted to the National Air Monitoring Network of the Ministry of Environmental Protection for the purpose of permanent storage and continued processing. Most of the transportation monitoring stations have been in full operation since 1998.

Uptime of monitoring stations: The percentage of time a station was active during the year. Uptime rates below 100% can be attributed to a fixed daily time devoted to scaling, instrument failure, or disruption of work at the station.

4. Methodology

a) The Investigated Population

The fleet of motor vehicles includes all the types of motor vehicles registered at the Vehicle Licensing Department, whose licenses were valid or expired during 2022. It does not include army and police vehicles, hauled vehicles, tractors, vehicles owned by foreign citizens and of holders of provisional vehicle licenses, vehicles registered in the Palestinian Authority, vehicles of tourists staying in Israel less than three months, diplomatic and UN vehicles, etc.

b) The Period Investigated

The information in this publication refers to 31 December 2022.

c) Method of Investigation and Sources of the Data

The vehicle data published by the CBS are based on processing of the administrative files received every month from the Vehicle Licensing Department in the Ministry of Transport and Road Safety.

Data on safety systems, gearboxes, engine power and airbags are obtained from the current Make and Models of Private and Commercial Vehicles file of the Ministry of Transport and Road Safety.

Data on the local installation of safety systems (lane departure warning system, forward distance monitoring system) are obtained from the Ministry of Transport and Road Safety.

Data on road accidents are obtained from the Israel Police and include road accidents with casualties that were classified according to two types of files: Road Accident Expanded (R.A. expanded) and General with Minor Casualties.

Concentrations of air pollutants from transportation monitoring stations are obtained from the Air Quality Division (National Air Monitoring Network) of the Ministry of Environmental Protection.

Emission factors of air pollutants from vehicles data are based on research conducted at the Technion.[6] To date, these emission factors have been developed only for private motor cars and for buses. Emission factors for other types of vehicles and other fuel types were based on European factors, which were obtained from the Air Quality Division (Mobile Sources Division) at the Ministry of Environmental Protection.

d) Handling of the Data

The Vehicle File: A file received from the Vehicle Licensing Department of the Ministry of Transport and Road Safety. The file is reviewed and processed at the CBS.

Air pollution from transportation: Quantities of air pollution emissions are calculated in the Agriculture, Environment and Energy Sector at the CBS, on the basis of annual quantities of different fuels consumed by motor vehicles; emission factors of air pollutants and annual kilometers traveled by the various types of vehicles, by age of vehicle.

Until 2010, the kilometers travelled were calculated using the CBS's Kilometers Travelled Survey, which was based on a sample of drivers' reports during the annual vehicle test at the vehicle inspection stations. As of 2011, the method of calculating yearly kilometers travelled has been changed and is now based on the vehicle files received from the Ministry of Transport and Road Safety. Using this method, the calculation is made by comparing the odometer reading recorded at two different registration tests for each vehicle, with an interval of approximately one year between each test.

e) Reliability of the Data

The data in this publication are based on processing of the "Vehicle File" (see above). In actuality, the data reflect the status of the "Vehicle File" at the end of 2022; therefore, the quality of the data and degree to which they are up-to-date depend on the quality of the "Vehicle File" and degree to which it was up-to-date on the day it was generated.

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[6] Tartakovsky, L., Veinblat, M., Gutman, M., Aleynikov, Y., & Zvirin, Y. (2000). *Estimation of Emission Factors from Diesel Vehicles in Israel (First Stage – Buses).* Research Report 277/2000. p. 64 [Hebrew only]. Technion – Israel Institute of Technology.