ADMINISTRATIVE AND LEGAL AFFAIRS DEPARTMENT

DRAFT DATED 26 March 2025

Regulations of the State Secretary for Infrastructure and Water Management, of ...., No IENW/BSK-2025/, laying down rules for the determination of the energy efficiency class and for the determination of the constants and values in the calculation of the relative energy efficiency of passenger cars (Regulations on the relative energy efficiency of passenger cars 2026)

(Chain ID WGK026753)

The State Secretary for Infrastructure and Water Management,

Having regard to Articles 6a and 8(1) of the Decree on the labelling of the energy consumption of passenger cars;

Hereby decrees the following:

Article 1

In these regulations, the following will apply:
Decree: Passenger Cars (Energy Consumption Labelling) Decree;
reference standard: measure for assessing the relative energy efficiency of new passenger cars expressed as power consumption, CO_2 emissions or hydrogen consumption;
reference value: value of the reference standard for determining the relative energy efficiency of new passenger cars depending on the size of the vehicle;
relative energy efficiency: the rate at which a new passenger car consumes more or less energy than the reference value for the energy consumption of the new passenger car concerned;
energy efficiency class: designation in classes A+++ to G indicating the relative energy efficiency of a new passenger car;
Comparison value for energy consumption: value of energy consumption expressed in kWh/100 km, which is used to determine the reference standard for comparing the energy efficiency of new passenger cars;
average length regression formula: the second-degree polynomial derived by means of the least squares method for the average length of a new passenger car depending on its width, which is necessary for the calculation of the relative energy efficiency of that passenger car;
regression formula for the average energy consumption: second-degree polynomial derived by means of the least squares method for the average energy consumption of a new passenger car depending on the size of the vehicle, which is necessary for the calculation of the relative energy efficiency of that passenger car.

Article 2

1. The energy efficiency class of a new passenger car model will be determined on the basis of the relative energy efficiency of the passenger car in accordance with the following table:

Energy efficiency class	Relative energy efficiency [%]

A+++	Relative energy efficiency < -40%
A++	-40% <= relative energy efficiency < -30%
A+	-30% <= relative energy efficiency < -20%
A	-20% <= relative energy efficiency < -10%
B	-10% <= relative energy efficiency < 00%
C	-00% <= relative energy efficiency < 10%
D	-10% <= relative energy efficiency < 20%
E	-20% <= relative energy efficiency < 30%
F	30% <= relative energy efficiency < 40%
G	40% <= relative energy efficiency

2. When determining the energy efficiency class, the relative energy efficiency will be expressed as a percentage relative to zero and not rounded off, whereby when several variants or versions are grouped together under one passenger car model, the energy efficiency class of the model to be declared will be based on the least economical variant or version of a passenger car within that group.
3. The relative energy efficiency is calculated according to the following six steps from (a) to (f):
   a. calculation of the average length using the regression formula average length:
      $\text{length}_{\text{avg.}} = C_{1,\text{ length}} + C_{2,\text{ length}} \times \text{width} + C_{3,\text{ length}} \times [\text{width}]^2$;
   b. calculation of the corrected length x width:
      $(\text{length} \times \text{width})_{\text{cor.}} = [0.7 \times \text{length} + 0.3 \times \text{length}_{\text{avg}}] \times \text{width}$;
   c. verification of the scope of application of the average energy consumption regression formula:
      i. for electric passenger cars,
         if: $(\text{length} \times \text{width})_{\text{cor.}} < -0.5 \times C_{2,\text{ electricity}}/C_{3,\text{ electricity;}}$
         then: $(\text{length} \times \text{width})_{\text{cor.}} = -0.5 \times C_{2,\text{ electricity}}/C_{3,\text{ electricity;}}$
      ii. for petrol and diesel cars:
         if: $(\text{length} \times \text{width})_{\text{cor.}} < -0.5 \times C_{2,\text{ petrol/diesel}}/C_{3,\text{ petrol/diesel;}}$
         then: $(\text{length} \times \text{width})_{\text{cor.}} = -0.5 \times C_{2,\text{ petrol/diesel}}/C_{3,\text{ petrol/diesel;}}$
         iii. For hydrogen passenger cars,
         if: $(\text{length} \times \text{width})_{\text{cor.}} < -0.5 \times C_{2,\text{ hydrogen}}/C_{3,\text{ hydrogen;}}$
         then: $(\text{length} \times \text{width})_{\text{cor.}} = -0.5 \times C_{2,\text{ hydrogen}}/C_{3,\text{ hydrogen;}}$
   d. calculation of the relative part of the reference value:
      i. for electric passenger cars:
         $\text{power consumption}_{\text{relative avg.}} = C_{1,\text{ electric}} + C_{2,\text{ electric}} \times [(\text{length} \times \text{width})_{\text{cor.}}] + C_{3,\text{ electric}} \times [(\text{length} \times \text{width})_{\text{cor.}}]^2$;
      ii. for petrol and diesel cars:
         $CO_2\text{ emissions}_{\text{relative avg.}} = C_{1,\text{ petrol/diesel}} + C_{2,\text{ petrol/diesel}} \times [(\text{length} \times \text{width})_{\text{cor.}}] + C_{3,\text{ petrol/diesel}} \times [(\text{length} \times \text{width})_{\text{cor.}}]^2$;
      iii. for hydrogen passenger cars:
         $\text{hydrogen consumption}_{\text{relative avg.}} = C_{1,\text{ hydrogen}} + C_{2,\text{ hydrogen}} \times [(\text{length} \times \text{width})_{\text{cor.}}] + C_{3,\text{ hydrogen}} \times [(\text{length} \times \text{width})_{\text{cor.}}]^2$;
   e. Calculation of the reference value:
      i. for electric passenger cars:
         $\text{power consumption}_{\text{ref.}} = 0.75 \times \text{power consumption}_{\text{relative avg.}} + 0.25 \times \text{total power consumption}_{\text{total avg}}$;
      ii. for petrol and diesel cars:
         $CO_2\text{ emissions}_{\text{ref.}} = 0.75 \times CO_2\text{ emissions}_{\text{relative avg.}} + 0.25 \times CO_2\text{ emissions}_{\text{total avg}}$;

iii. for hydrogen passenger cars:
hydrogen $consumption_{ref.}$ = 0.75 x hydrogen $consumption_{relative\ avg}$ + 0.25 x hydrogen $consumption_{total\ avg.}$;

f. Calculation of relative energy efficiency:
   i. for electric passenger cars:
   relative energy efficiency = [power consumption - power $consumption_{ref.}$]/power $consumption_{ref.}$ x 100%;
   ii. for petrol and diesel cars:
   relative energy efficiency = [CO_2 emissions – CO_2 $emissions_{ref.}$]/ CO_2 $emissions_{ref.}$ x 100%;
   iii. for hydrogen passenger cars:
   relative energy efficiency = [hydrogen consumption - hydrogen $consumption_{ref.}$]/hydrogen $consumption_{ref.}$ x 100%.

4. For the purpose of determining the energy efficiency class for passenger cars for which the test referred to in Regulation (EU) 2017/1151 has been carried out with LPG, NG or E-85 as fuel, the CO_2 emissions of the passenger car with LPG, natural gas and E-85 respectively as fuel will be used.
5. Passenger cars with a retrofitted LPG or natural gas installation that have undergone the test laid down in Regulation (EU) 2017/1151 with petrol as fuel will be regarded as passenger cars with petrol as fuel.
6. Plug-in hybrid passenger cars are considered to be petrol- or diesel-fuelled passenger cars for the purpose of determining relative fuel efficiency, the CO_2 emission and power consumption being added together as follows for the calculation of relative energy efficiency:
   CO_2 emissions for relative fuel efficiency calculation = CO_2 emission + 5 x power consumption
7. The data to be entered will be taken from the certificate of conformity (CoC) accompanying the vehicle concerned as follows:
   a. length: point 6 of the certificate of conformity;
   b. width: point 7 of the certificate of conformity;
   c. power consumption: point 49 of the certificate of conformity;
   d. CO_2 emissions: point 49 of the certificate of conformity;
   e. hydrogen consumption: point 49 of the certificate of conformity.
8. The values referred to in the seventh paragraph will be entered as follows:
   a. length and width in metres, to the nearest three decimal places;
   b. the power consumption in kWh/100 km, with an accuracy of one decimal place;
   c. the CO_2 emissions in grams/km, rounded to the nearest whole number;
   d. the hydrogen consumption in kilograms per 100 km, with an accuracy of two decimal places.

Article 3

1. The constants and values referred to in Article 8(1) of the Decree concern the following data:
   a. the constants $C_{1,\ length}$, $C_{2,\ length}$ and $C_{3,\ length}$ of the average length regression formula for calculating the average length referred to in Article 2(3)(a);
   b. the constants $C_{1,\ electric}$, $C_{2,\ electric}$ and $C_{3,\ electric}$ of the regression formula on average energy consumption expressed in power consumption, for the calculation of the relative part of the reference value for electric passenger cars, referred to in Article 2(3)(d)(i);

c. the constants $C_{1,\ petrol/diesel}$, $C_{2,\ petrol/diesel}$ and $C_{3,\ petrol/diesel}$ of the regression formula average energy consumption expressed in CO_2 emissions, for the calculation of the relative part of the reference value for petrol and diesel vehicles referred to in Article 2(3)(d)(ii);
d. the constants $C_{1,\ hydrogen}$, $C_{2,\ hydrogen}$ and $C_{3,\ hydrogen}$ of the regression formula average energy consumption expressed in hydrogen consumption, for the calculation of the relative part of the reference value for hydrogen passenger cars referred to in Article 2(3)(d)(iii);
e. the power consumption value $_{total\ avg.}$ for the total average energy consumption expressed in power consumption, being the absolute part of the reference value for electric passenger cars referred to in Article 2(3)(e)(i);
f. the value of CO_2 emissions $_{total\ avg.}$ for the total average energy consumption expressed as CO_2 emissions, being the absolute part of the reference value for petrol cars and diesel cars referred to in Article 2(3)(e)(ii);
g. the value of hydrogen consumption $_{total\ avg.}$ for the total average energy consumption expressed in hydrogen consumption, being the absolute part of the reference value for hydrogen cars referred to in Article 2(3)(e)(iii).

2. The constants and values referred to in the first paragraph will be calculated on the basis of the data of new passenger cars sold in the two calendar years preceding the year in which the constants and values are determined, except for the models with a length x width greater than 11 m^2.
3. The constants $C_{1,\ length}$, $C_{2,\ length}$, $C_{3,\ length}$ of the regression formula for the average length referred to in (a) of the first paragraph will be calculated using the least squares method on the basis of the length, width and number of new passenger cars sold.
4. The constants of the regression formula for the average energy consumption expressed respectively in power consumption, CO_2 emissions and hydrogen consumption referred to in (b), (c) and (d) of the first paragraph and the values for the total average energy consumption expressed respectively in power consumption, CO_2emissions and hydrogen consumption referred to in (e), (f) and (g) of the first paragraph for the calculation of the reference values of electric passenger cars, petrol and diesel cars and hydrogen passenger cars will be found as follows:
   a. for electric passenger cars
      $C_{1,\ electric} = C_{1,\ consumption}$
      $C_{2,\ electric} = C_{2,\ consumption}$
      $C_{3,\ electric} = C_{3,\ consumption}$
      power consumption $_{total\ avg.}$ in [kWh/100 km] = consumption $_{total\ avg.}$ in [kWh/100 km];
   b. for petrol and diesel cars:
      $C_{1,\ petrol/diesel} = 5 \times C_{1,\ consumption}$
      $C_{2,\ petrol/diesel} = 5 \times C_{2,\ consumption}$
      $C_{3,\ petrol/diesel} = 5 \times C_{3,\ consumption}$
      CO_2 emissions $_{total\ avg.}$ [g/km] = 5 x consumption $_{total\ avg.}$ in [kWh/100 km];
   c. for hydrogen passenger cars:
      $C_{1,\ hydrogen} = 0.05 \times C_{1,\ consumption}$
      $C_{2,\ hydrogen} = 0.05 \times C_{2,\ consumption}$
      $C_{3,\ hydrogen} = 0.05 \times C_{3,\ consumption}$
      hydrogen consumption $_{total\ avg.}$ in [kg/100 km] = 0.05 x consumption $_{total\ avg.}$ in [kWh/100 km].

5. The constants $C_{1, consumption}$, $C_{2, consumption}$ and $C_{3, consumption}$ of the initial derived regression formula for the average energy consumption referred to in (a), (b) and (c) of the fourth paragraph will be calculated using the least squares method on the basis of the comparison values of energy consumption and the number of new passenger cars sold, with the comparison value for energy consumption calculated as follows:
   a. for electric passenger cars:
      Comparison value in [kWh/100 km] = power consumption in [kWh/100 km];
   b. for petrol and diesel cars:
      comparison value in [kWh/100 km] = 0.2 x CO_2 emission in [g/km];
   c. for plug-in hybrid passenger cars:
      comparison value in [kWh/100 km] = power consumption in [kWh/100 km] + 0.2 x CO_2 emission in [g/km];
   d. for hydrogen passenger cars:
      comparison value in [kWh/100 km] = 20 x hydrogen consumption in [kg/100 km].
6. For electric passenger cars, petrol cars, diesel cars, plug-in hybrid passenger cars and, where possible, hydrogen passenger cars respectively, separate regression formulas for the average energy consumption will be derived, after which the initial derived regression formula for the average energy consumption will be found separately as the sales-weighted average of the regression lines for the aforementioned categories of passenger cars separately.
7. The value for $consumption_{total\ avg.}$ for the total average energy consumption referred to in the fourth paragraph will be found as the average of the comparison values for energy consumption, referred to in the fifth paragraph, of all the new passenger cars sold.

Article 4

The Relative Efficiency of Passenger Cars Regulations are repealed.

Article 5

These Regulations will enter into force on the date of entry into force of the Decree (…) amending the Energy Consumption Labelling (Passenger Cars) Decree (…).

Article 6

These regulations will be cited as the: Regulations on the relative energy efficiency of passenger cars 2026.

These regulations and the explanatory notes will be published in the Government Gazette.

STATE SECRETARY FOR INFRASTRUCTURE AND WATER MANAGEMENT – PUBLIC TRANSPORT AND ENVIRONMENT,

C.A. Jansen

Explanation

General explanatory notes

1. Introduction

New passenger cars displayed in a showroom must be provided with an energy label pursuant to Directive 1999/94/EC[1]. This has been implemented in the Energy Consumption Labelling (Passenger Cars) Decree. The energy label for passenger cars specifies the values for the official fuel consumption and the official CO_2 emission. The label will also indicate the energy efficiency class of a passenger car. This is done by means of a coloured arrow from A (green) for efficient to G (red) for inefficient. See the table in Paragraph 2(1). The method for calculating the energy efficiency class will be laid down by ministerial order. In order to make the label suitable for electric passenger cars, the method of calculation must be adapted. As this involves a large number of amendments, the regulations are re-established with the new title of the Relative Energy Efficiency Passenger Cars Regulations 2026 (hereinafter: the Regulations). Part of the detailed explanation of this new definition has been used to restate the approach with regard to the original method of calculation for the energy label.

With the new method of calculation, electric passenger cars and hydrogen passenger cars will also be allocated an energy label of A to G. This is achieved by using power consumption as a basis for the allocation of the label. In the original method of calculation for determining the energy efficiency class, electric and hydrogen passenger cars were always automatically allocated the A label. This did not allow for a proper comparison of electric passenger cars as regards on the power consumption for consumers. In addition, plug-in hybrid passenger cars were almost always given the A label under the old method of calculation. In the case of plug-in hybrid passenger cars, under the new method of calculation such passenger cars will be given a more realistic label in relation to electric passenger cars and petrol and diesel cars from 2026 onwards.

The Regulations contain the method of calculation for determining the relative energy efficiency of passenger cars with all forms of power consumption and the principles for biennial adoption of the reference standard for determining the relative energy efficiency. In line with the results, passenger cars will be allocated an energy label on the basis of the adjusted table with three additional energy efficiency classes in Paragraph 2. The wider range of energy efficiency classes makes it possible to visualise the energy consumption of electric passenger cars among such passenger cars and in relation to the consumption of petrol and diesel cars.

[1] Directive 1999/94/EC of the European Parliament and of the Council of 13 December 1999 relating to the availability of consumer information on fuel economy and CO2 emissions in respect of the marketing of new passenger cars (OJ L 12, 2000);

Background
As a result of the setting of European standards for the average CO_2 emissions of new passenger cars in Regulation (EU) 2018/858, the sales of new passenger cars[2] will change significantly in the coming years. From 2035 onwards, only zero-emission new passenger cars may be sold in Europe. In practice, these will be electric passenger cars and hydrogen passenger cars. The sale of new conventional petrol and diesel cars will gradually decrease until 2035. During the transitional period, some of the new sales will still consist of plug-in passenger cars, but these too will no longer be allowed from 2035. Given these upcoming changes in the sales of new passenger cars, it is necessary to make the energy label suitable for electric, hydrogen and (as long as they are still allowed to be sold) plug-in hybrid passenger cars, thus keeping consumers well informed about the energy efficiency of new passenger cars.

2. Outline of the proposal

The new method of calculation for the energy efficiency classes introduces three additional fuel efficient variants of the A-label: A++++ A++ and A+. The method of calculation has been elaborated in such a way that the breakdown of the models of new passenger cars falls within the scope of the available labels A+++ to G. This provides optimal support for the following effects in purchasing behaviour:
- purchasers of electric passenger cars proceed to purchase an energy-efficient electric passenger car.
- buyers of passenger cars running on a fossil fuel purchase an energy-efficient passenger car running on fossil fuel.
- purchasers of a new passenger car will consider the purchase of a zero-emission passenger car.

The letter of 22 March 2022 of the State Secretary for Infrastructure and the Environment to the House of Representatives of the States-General on the Cabinet approach to Climate Policy - Mobility Policy[3] already mentions the adjustment of the energy label for zero-emission passenger cars, which primarily provides for the power consumption to be indicated on the label for zero-emission passenger cars and plug-in hybrid passenger cars. In addition, it was announced that consideration will be given to the possibility of determining the energy label for zero-emission and plug-in passenger cars (in part) on the basis of power consumption.

The adapted method of calculation for the energy label for all fuels and also for electricity will be based on the same reference standard for the determination of the energy label A to G. The reference standard will be the criterion for the calculation of the relative energy efficiency of new passenger cars and thus for the categorisation into one of the energy efficiency classes A to G on the new energy label. In the original method of calculation, separate reference standards applied to petrol and diesel. This was done at the time because diesel cars at the time of the introduction of the energy label in 2000 were much more polluting than petrol cars as regards particulate matter and nitrogen oxides. At that time, the energy label was not aimed at achieving a shift in purchasing behaviour from petrol to diesel

[2] Regulation (EU) 2018/858 of the European Parliament and of the Council of 30 May 2018 on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, amending Regulations (EC) No 715/2007 and (EC) No 595/2009 and repealing Directive 2007/46/EC (OJ 2018, L 151);

[3] Parliamentary Papers II 2021/22, 32813, No 1004.

with the energy label. Current diesel cars are as clean as petrol cars in terms of emissions of particulate matter and nitrogen oxides. Any undesirable shift to diesel is no longer relevant. Petrol and diesel cars are, therefore, treated the same in the adjusted calculation method.

With this adjustment in the method of calculation, a gradual transition will be achieved in the period up to 2035 in the energy labels of new models of passenger cars with a conventional motor with petrol, diesel, LPG or CNG as fuel and of new models of passenger cars with electricity and hydrogen as the source of energy. The assessment of models with conventional propulsion gradually shifts from average energy efficiency (green or yellow energy label) to energy-inefficient (orange or red). See the table of energy efficiency classes below under point 1. The assessment of models with electric propulsion gradually shifts from energy efficient (green energy label) to average energy efficiency (yellow or green energy label). The progressivity is the result of the two-yearly tightening of the reference standard for determining energy efficiency. This tightening is partly due to the increase in sales of electric passenger cars.

The method of calculation has been elaborated in such a way that the assessment of hydrogen-electric passenger cars coincides with the assessment of battery-electric passenger cars. Hydrogen-electric passenger cars are thus assessed on average as energy-efficient as battery-electric cars for the energy label. For plug-in hybrid passenger cars, an abrupt change in the assessment of energy efficiency occurs with the entry into force of the new method of calculation. As power consumption is taken into account for the determination of the energy efficiency class in addition to fossil fuel consumption, a less favourable energy label will be attributed to such passenger cars from 2026 onwards. The assessment of the energy efficiency of plug-in hybrid passenger cars will be between those of fossil fuel powered passenger cars and battery electric passenger cars. Models with a small battery (and thus relatively high CO_2 value) are close to fossil cars and models with a large battery (and thus relatively low CO_2 value) are close to electric passenger cars.

Further explanation of the changes
With this adoption of the Regulations, the following adjustments are made to the method of calculation for the relative energy efficiency. First, the energy efficiency classes are adapted and extended (see point 1). In order to enable a comparison of the energy consumption of electric, fossil fuel, hydrogen and plug-in hybrid passenger cars, the concept of a 'comparison value of energy consumption' is introduced (see point 2). This new unit is intended to enable all new passenger cars to be compared against each other in terms of energy efficiency using the same reference standard expressed in kilowatt hours per 100 kilometres (kWh/100 km). Next, the method of setting the reference standard as a criterion for determining the relative energy efficiency also changes (see point 3). These adjustments are explained in more detail below.

<u>1. Adjustment to energy efficiency classes</u>

These Regulations introduces three new sub-variants of the A label with regard to the energy efficiency class: A+++, A++ and A+. This adjustment is necessary because the comparison of all fuels on the basis of a single reference standard increases the required range of inefficient and efficient passenger cars, especially at the lower end. The three sub-variants of the A label fall under the standard A category. Just as with the other energy efficiency classes, the three additional plus categories of the A label have a bandwidth of 10%. On the physical energy label, the 'pluses' for the A label are mentioned in only the broad, green A arrow on the right side of the energy label. The narrower green-yellow-red arrows depicted on the left side of the energy label indicating the label A to G do not change. The colour of the sub-variants is the same as the colour of the A label, i.e. with the same shade of green.

In addition to the introduction of these plus categories of the A-label, a shift of 5% of all energy efficiency classes will be implemented. For example, the C-label ranged from -5% to +5%. With the 5% shift, this will be from 0% to 10%. This ensures that the energy label of conventional passenger cars with petrol or diesel as fuel is slightly more favourable after the adjustment or: shows as more energy-efficient. Due to the fact that, with the adjustments envisaged, the reference standard for the energy label is also based on the zero-emission passenger cars sold, this standard becomes somewhat stricter with the introduction of the new method of calculation. Without this 5% shift, conventional passenger cars would be assessed as less energy-efficient compared to the current situation. This would mean that new models of petrol or diesel passenger cars could thus end up in a more inefficient energy efficiency class.

With the three additional plus categories of the A-label and the generic shift of 5%, there will be five efficiency classes below zero percent (A+++, A++, A+, A and B) and five above zero percent (C, D, E, F and G). With these amendments, the overview of energy labels becomes as follows:

Energy efficiency classes new energy label table

Energy efficiency class	**Old energy efficiency classification [%]**	**New energy efficiency classification [%]**
A+++	-	< -40%
A++	-	-40% - -30%
A+	-	-30% - -20%
A	< -15%	-20% - -10%
B	-5% - -15%	-10% - 0%
C	-5% - 5	0% - 10%
D	5% - 15%	10% - 20%
E	15% - 25%	20% - 30%
F	25% - 35%	30% - 40%
G	> 35%	> 40%

2. Definition of comparison value for energy consumption

As part of the amended method of calculation method, the energy consumption of conventional petrol or diesel cars and of electric and hydrogen passenger cars is compared on the basis of a single common reference standard. Following from European legislation, after 2035 the entire supply of new passenger cars will be zero emission and the majority of these will consist of battery-electric cars. In order to make the regulations future-proof, the comparison of all passenger cars is based on the power consumption of battery-electric passenger cars, i.e. on a kWh/100 km standard. In order also to relate the energy consumption of passenger cars fuelled with petrol, diesel, LPG, CNG and plug-in passenger cars to this standard, the CO_2 emissions of a passenger car with a conventional combustion engine are converted by a given factor into a comparison value for energy consumption expressed in kWh/100 km. The comparison value for the energy consumption of a petrol or diesel car is, therefore, equal to the power consumption of an equally large electric passenger car, which is assessed as economically efficient for the energy label as the car in question with a conventional combustion engine.

The conversion factor of CO_2 emissions into power consumption will be chosen in such a way that, during the transitional period, the assessment of passenger cars, with regard to the allocation of the energy labels A+++ to G, reasonably fits within the scope of the energy labels (i.e. between -40% and +40% compared to the reference standard). In view of the desired effects in purchasing behaviour referred to in paragraph 2, it has been proven experimentally (by means of calculations of the label of all models available on the market) that a conversion factor of 0.2 meets this requirement. With the factor 0.2, a passenger car with CO_2 emissions of, for example, 140 g/km is allocated the same assessment as regards efficiency as an electric passenger car with a power consumption of 140 x 0.2 = 28 kWh/100 km. To determine the comparative consumption of plug-in passenger cars, the values of the CO_2 emission and the power consumption must be added together. With a conversion factor of 0.2, a plug-in hybrid passenger car with a CO_2 value of 40 g/km and a power consumption of 17.8 kWh/100 km is assessed as equally energy efficient as a battery-electric passenger car with a power consumption of 40 x 0.2 + 17.8 = 25.8 kWh/100 km. The comparison value for the energy consumption of these plug-in hybrid passenger cars is thus equal to the comparison value of a petrol or diesel passenger car emitting 25.8 x 5 (the inverse or reciprocal value of the conversion factor 0.2) = 129 g/km CO_2.

The adapted method of calculation for the energy efficiency class gives hydrogen-electric passenger cars their own neutral assessment of energy efficiency compared to battery-electric passenger cars. A conversion factor of 20 kWh per kg of hydrogen has been shown to achieve a neutral assessment of hydrogen-electric passenger cars compared to battery-electric passenger cars. With this factor, a hydrogen car with a consumption of 1 kg of hydrogen per 100 km receives the same energy efficiency assessment as an electric passenger car with a power consumption of 1 x 20 = 20 kWh/100 km. The comparison value for the energy consumption of this hydrogen passenger car is thus equal to the comparison value of a petrol or diesel passenger car, which emits 20 x 5 (the reciprocal value of the conversion factor 0.2) = 100 g/km CO_2.

The starting point for the choice of 0.2 for the conversion factor was that the distinctiveness of the car label does not deteriorate, i.e. the bandwidth of the energy efficiency classes remains equal to 10%. With the choice of a higher conversion factor for the conversion of CO_2 emissions to power consumption (e.g. a factor of 0.4 instead of 0.2) combined with a higher bandwidth for the energy efficiency classes (e.g. width of 20% instead of 10%), the efficiency assessment of electric passenger cars, on the one hand, and petrol and diesel cars, on the other, could have been kept within the range of the energy labels. However, this choice would have significantly reduced the distinctive character of the energy label for, on the one hand, electric passenger cars among such vehicles and for, on the other hand, petrol and diesel cars among such vehicles. With a bandwidth of 20%, the majority of electric passenger cars would be allocated a B or C label after 2035. As a result, (too) few models would receive a better label than B or a worse label than C. Because this would significantly reduce the effectiveness of the energy label, a lower conversion factor combined with a larger bandwidth has not been chosen.

3. Method of establishing the reference standard

The energy efficiency of a new passenger car model is the percentage by which a passenger car is more efficient or inefficient than the value of the reference standard for the model in question. For each new passenger car model, the reference value is determined for 75% by the relative energy consumption according to the vehicle size of the model concerned and for 25% by the average absolute energy consumption of all models. The relative energy consumption here is the average energy consumption of all models with the same vehicle size as the model in question. The vehicle size acts as a parameter for the utility value of the car in question and is determined by the ground area (= length x width) of the vehicle. The average energy consumption by vehicle size is calculated using the regression formula for the average energy consumption. Vehicle size is taken into account in the calculation of the relative energy efficiency in order to prevent larger passenger cars from scoring lower on energy efficiency due to their size alone.

The regression formula for the average energy consumption is found using the so-called least squares method[4] on the basis of the data on energy consumption of newly registered passenger cars. The CO_2 values expressed in g/km of passenger cars using petrol, diesel, LPG or CNG as fuel are converted, as indicated above in point 2, by a factor of 0.2 into comparison values for energy consumption, which are expressed in kWh/100 km. For hydrogen passenger cars, the factor 20 will be used to convert hydrogen consumption expressed in kg/100 km to the comparison value for energy consumption expressed in kWh/100 km.

The determination of the average energy consumption by vehicle size as well as the average absolute energy consumption will always be done on the basis of passenger cars registered for the first time in the previous two years. A new reference standard will then apply for two years following the year in which the new standard was adopted. In this way, the reference standard for 2026 and 2027 will be set in 2025 on the basis of the new passenger cars registered for the first time in 2023 and 2024. Models with a length x width greater than 11 m^2 will be excluded

[4] The least squares method is a statistical method of calculation used in order to find the best approximation formula on the basis of measured values. In this case, the least squares method will be used, inter alia, to find the best approximation formula for the average energy consumption (Y) as a function of vehicle size (X). The approximation formula used for this purpose is a second-degree polynomial: $Y = C_1 + C_2 \times X + C_3 \times X^2$. Using the least squares method, the constants C_1, C_2 and C_3 will be determined in such a way that the formula gives the best approximation for the values measured.

from the calculation of the averages. If a large number of such vehicles, mostly extended passenger buses for group transport, are sold, this category has a distorting effect on the least squares calculation.

The regression formula for the average energy consumption is applied in three variants: expressed in kWh/100 km for the power consumption of electric passenger cars, expressed in g/km CO_2 emissions for petrol and diesel cars and expressed in kg/100 km for the hydrogen consumption of hydrogen passenger cars. In parallel, the calculation formulas for determining the relative energy efficiency in these three variants are also applied. In the calculation formulas, a distinction is always made between these three variants in order to minimise the adjustments to be made to the suppliers' software for determining the energy label as far as possible. With three variants, as in the past, constants and values can be entered for each form of fuel or energy every two years and there is no need to convert to comparison value.

With regard to vehicle size, a correction will be applied in the method of calculation for the energy label to give a three-door or five-door hatchback version of a model a proportionately greater utility value than a saloon car or station wagon version of that model. Thus, capacity for passenger transport is allocated a higher utility value than capacity for the transport of goods. This will prevent larger passenger cars for the transport of goods (such as saloon cars and station wagons with a large luggage compartment) from being unintentionally given a more favourable energy label than smaller versions (such as hatchbacks). The correction for the vehicle size is achieved by making the width of a vehicle count relatively more than the length. This is achieved by assuming that the length of a vehicle is 30% of the average length of a new passenger car for a given vehicle width and 70% as the actual length of the vehicle. The regression formula for the average length is also found with the least-squares method.

Article 2 of the Regulations sets out and establishes the above method for calculating the relative energy efficiency and the allocation of energy efficiency classes on the basis of the results thereby. The relative energy efficiency is assessed on the basis of the reference standard for the energy consumption of new passenger cars. Under this standard, a reference value for energy consumption can be established for each vehicle size of passenger cars (ground area). To calculate the reference standard, regression formulas for the average power consumption, average CO_2 emissions and average hydrogen consumption for the passenger cars concerned are used. Article 3 of the Regulations lays down how the constants of these regression formulas and values for the total average energy consumption for the calculation of the relative efficiency are found. See also the explanations of each article for this.

3. Relationship to higher law

The Regulations are based on Articles 6a and 8(1) of the Energy Consumption Labelling (Passenger Cars) Decree. Pursuant to Article 6a of these regulations, rules are laid down by ministerial order for the determination of the energy efficiency class and the determination of the constants and values for the purpose of calculating relative efficiency. On the basis of Article 8, the RDW (National Vehicle and Driving Licence Registration Authority) determines, before 1 March, the constants for the regression formulas to be determined by ministerial order, as well as the corresponding values for the purpose of calculating the relative efficiency.

4. Impacts

In the new Regulations, the following changes are made to the method for calculating the energy efficiency for the energy label:
- Three additional energy efficiency categories (A+++, A++ and A+);
- The limits of the energy efficiency categories shift by 5%;
- For plug-in passenger cars, the power consumption must also be included in the formulas;
- For electric and hydrogen passenger cars, an energy label must be calculated.

For passenger cars with petrol, diesel, LPG or CNG as the fuel, the formula for determining the reference standard for the CO_2 emission remains the same. The biennial introduction of new constants is also maintained.
The energy labels will be distributed by suppliers (importers) to dealers electronically. The suppliers will have to make one-off adjustments to their software for calculating the energy efficiency classes. A corresponding adaptation of software at the RDW is also necessary for the calculation of the energy efficiency classes and for the production of the fuel consumption guide.

As mentioned in the explanatory memorandum to the Decree, as a result of the adjustments to the method of calculation for the energy efficiency category for the energy label at the RDW, the registration module must be amended.
The overall expectation is that this is feasible and that it will take about 400 hours on a one-off basis. There will then be no recurring (additional) costs as a consequence of this amendment.

The impacts on the RDW, dealers and suppliers are described in the explanatory memorandum of the amendment to the Energy Consumption Labelling (Passenger Cars) Decree of (...).

5. Implementation, supervision and enforcement

The Human Environment and Transport Inspectorate (ILT) is charged with the enforcement of the energy label. For the ILT, the proposed changes entail a limited adaptation of the instructions for checking the presence and correctness of the energy label for new passenger cars in the showroom:

In the case of battery-electric passenger cars and plug-in hybrid passenger cars, it must be checked whether the correct power consumption is stated on the energy label.
In case a model of new passenger car has been allocated an A-label, it must be checked whether it is the correct sub-variant of the A-label: A+++, A++, A+ or A.

The Human Environment and Transport Inspectorate (ILT) has carried out an Enforcement, Feasibility and Fraud Resistance Test (HUF test). The ILT checks energy labels on a random basis against the CoC. These amendments do not affect this verification of compliance with the Regulations of the Decree. As regards feasibility, it is expected that no additional FTE is required and that it is possible to manage with the current staffing levels for energy labels. There are new laws and regulations in this respect, as a result of which an anti-fraud protection check has been omitted.

The RDW has identified where the planned changes affect the work of the RDW. The changes in the systems and processes fit within the RDW's existing organisational structure and involve an effort only as regards processing new or changed data. Neither adjustments to the ICT infrastructure of the systems nor the use of new systems will be necessary. Therefore, the RDW does not see any problems with the implementation of the envisaged amendments. The implementation test relates in particular to the Decree and less to the impacts of the Regulations.

6. Opinion

The Regulations were submitted to the Advisory Board on Regulatory Burden (ATR) on 13 December 2024. The ATR has not selected this case for a formal opinion because it is not expected to have a significant impact on the regulatory burden.

7. Internet consultation

Internet consultation

In the period from 19 December 2024 to 24 January 2025, 11 responses were received to the proposed amendments to the Decree on energy consumption labelling for passenger cars and the Regulations. The responses to this Internet consultation concern only the amendment of the Decree. No comments were received on the new Regulations.

8. Entry into force

[expected 1 January 2026]. The Regulations will enter into force at the same time as the amendment to the Decree on energy labelling for passenger cars.

(…)

Article-by-Article Explanatory Notes

Article 1

Article 1 defines a number of terms: Decree, reference standard, reference value, relative energy efficiency, energy efficiency class, energy consumption comparison value, regression formula for the average length and regression formula for the average energy consumption. Some concepts have been taken over from the Decree because these materials are only applied in the Regulations and are intertwined in the calculation of the relative energy efficiency. In the following, the technical concepts are explained given their interdependence.

The *relative energy efficiency* indicates the extent to which a passenger car consumes more or less power, emits more or less CO_2 or consumes more or less hydrogen than the *reference value* for the passenger car in question. In other words, whether the passenger car is more or less energy efficient compared to the *reference value*. The *relative energy efficiency* of a passenger car determines the *energy efficiency class* into which that car will fall. This means that the greater the positive or negative difference in the energy efficiency of a passenger car compared to the *reference value*, the higher or lower this car will score in *energy efficiency class*. The so-called *comparison value for the energy consumption* is used to indicate the difference in energy efficiency of cars powered by electricity, a fossil fuel and hydrogen. This value is expressed for all passenger cars in kilowatt hours per 100 kilometres (kWh/100 km), i.e. on the basis of one parameter enabling all the aforementioned passenger cars to be compared to each other in terms of energy efficiency.

The *reference standard* is the basis for assessing the *relative energy efficiency of* a new passenger car. That standard determines the zero line for assessing the *relative energy efficiency of* passenger cars. For each vehicle size of a passenger car, the energy consumption value can be calculated according to the *reference standard.* The value declared by the manufacturer for the energy consumption of a new passenger car may differ to a greater or lesser extent from the *reference value* for energy consumption.

The *regression formula for the average length* is used to make the width of a car count relatively more than the length when determining the size of a car. The *regression formula for the average length* is an approximation formula for the average length of a vehicle as a function of width (X). The approximation formula used is a second-degree polynomial. This is a formula with the form: $Y = C_1 + C_2 \times X + C_3 \times X^2$. The constants $C_{1,\ length}$, $C_{2,\ length}$ and $C_{3,\ length}$ of the regression formula for the average length will have a value such that the formula gives the best approximation of the average length as a function of the width of a vehicle. The constants $C_{1,\ spring}$, $C_{2,\ length}$ and $C_{3,\ length}$ are determined biennially by the least squares method (see explanation in a footnote to paragraph 2(3). The input for this calculation is a file of the RDW with data on new passenger cars sold.

The *regression formula for the average energy consumption* is used to determine the reference standard (for this concept, see the explanation above) for the energy consumption of a passenger car. The *regression formula for the average energy consumption* is an approximation formula for the average energy consumption (Y) as a function of the vehicle size (X). The approximation formula used is a second-degree polynomial. This is a formula with the form: $Y = C_1 + C_2 \times X + C_3 \times X^2$. The constants C_1, C_2 and C_3 of the regression formula for the average consumption will have a value such that the formula gives the best approximation of the average energy consumption as a function of the vehicle size. The constants C_1, $C_{2,}$ and $C_{3,}$ are established biennially by the least-squares method (see explanation in a footnote to paragraph 2(3). The input for this calculation is a file of the RDW with data on new passenger cars sold.

Article 2

In paragraph 1, in the table included, three new energy classes with A+, A++ and A+++ have been added. These classes have been added in particular to allow for a distinction in the energy efficiency assessment of electric passenger cars when introducing the new method of calculation for the energy efficiency classes in 2026. The determination of the energy efficiency classes will be based on bandwidths of 10 percentage points relative to the reference standard: the zero or zero line. This was 5 percentage points and is shifted to 0 percentage points with this change. The ranges indicate the energy efficiency in a total of 10 energy classes of which 5 are above and 5 below the zero reference standard.
The degree to which a passenger car is more or less energy efficient compared to the reference standard, the relative energy efficiency, determines the energy efficiency class in which a particular model falls.

The third paragraph concerns the calculation of the relative energy efficiency. This calculation is made in the following six steps using the formulas used therein:

a. calculation of the average length using the regression formula for the average length;
b. calculation of the corrected length x width;
c. verification of the scope of the regression formula for the average energy consumption;
d. calculation of the relative part of the reference standard;
e. Calculation of the reference value;
f. Calculation of the relative energy efficiency.

The corrected length x width of a vehicle will be calculated in the steps referred to in (a) and (b). No changes have been made in these steps compared to the old method of calculation. The general part, Paragraph 2(3) explains how the average vehicle length is used to determine the corrected length x width. It is also explained here that, in the steps of (c) to (f) of the new approach, a distinction is always made between the calculation formulas for (i) electric passenger cars, (ii) petrol and diesel cars and (iii) hydrogen passenger cars. In the calculation formulas for electric passenger cars, the energy consumption is expressed in kWh/100 km for the power consumption, in the formulas for petrol and diesel cars in g/km of CO_2 emission and in the formulas for hydrogen passenger cars in kg/100 km for the hydrogen consumption.

In the step (c), the scope of the regression formula for the average energy consumption will be checked. Indeed, the regression formula for the average consumption is not applicable for (very) small vehicle sizes. Indeed, including (very) small vehicle sizes in the regression formula for the average consumption would lead to undesirable, non-realistic results on the average energy consumption of these vehicles. The non-application for (very) small vehicle sizes is due to the type of formula chosen for the regression formula. As explained in the general part of the explanatory notes (footnote of paragraph 2 under point 3), the best approximation formula for the average energy consumption (Y) is a second-degree polynomial as a function of vehicle size (X). In this type of formula, there is an issue of a dip in values where the energy consumption found is minimal for the respective vehicle size. To the right of the dip, the values found for the energy consumption (Y) increase with the increasing vehicle size (X). However, to the left of the dip, the average energy consumption values found also increase with decreasing vehicle sizes. Increasing consumption with decreasing vehicle size is not in line with the reality. The scope of the regression formula for average energy consumption, therefore, concerns only vehicle sizes to the right of the dip. The purpose of the step in (c) is that, for vehicle sizes to the left of the dip, the value of the dip is taken to the value of the vehicle size (X). With this value, the minimum value of the dip is found in the step under (d) as the value for energy consumption.

The relative part of the reference value for the energy consumption corresponding to the vehicle size in question will be calculated in the step referred to in (d). The relative part of the reference value consists of the average energy consumption of all passenger cars that are as large as the car in question. The average value for the energy consumption corresponding to the respective vehicle size is found using the regression formula for the average energy consumption. As indicated above, the average energy consumption by vehicle size is expressed in (i) kWh/100 km for the power consumption for electric passenger cars, (ii) g/km CO_2emissions for petrol and diesel cars and (iii) kg/100 km for the hydrogen consumption for hydrogen passenger cars.

In the step under (e), the reference value for the energy consumption will then be found as the weighted average of the relative energy consumption corresponding to the respective vehicle size (weighting 75%) and the absolute energy consumption of all new passenger cars (weighting 25%). The absolute energy consumption is the total average energy consumption of all passenger cars, again expressed in (i) kWh/100 km power consumption for electric passenger cars, (ii) g/km CO_2 emissions for petrol and diesel cars and (iii) kg/100 km for the hydrogen consumption of hydrogen passenger cars.

Finally, in (f), the relative energy efficiency is calculated as the percentage by which the new passenger cars consume more or less energy than the reference standard for the vehicle in question. This ultimately determines the subdivision of passenger car models into energy efficiency classes.

The fourth and fifth paragraphs update some of the Commission regulations to which reference is made.

The sixth paragraph provides that a plug-in hybrid passenger car is to be regarded as a passenger car fuelled with petrol or diesel for the purposes of calculating the reference standard. To calculate the reference standard, the CO_2 emissions and power consumption are added together. Here, the power consumption of plug-in hybrid passenger cars must be converted to CO_2 emissions. As explained in the general part of the explanatory memorandum, a factor of 0.2 is applied to the conversion of CO_2 emissions to power consumption. For the conversion from power consumption to CO_2emissions, the reverse or repeat value of the conversion factor from CO_2 emissions to power consumption should be used, i.e. 1/0.2 = 5. A plug-in hybrid passenger car with a CO_2 emission of 40 g/km and a power consumption of 17.8 kWh/100 km is, therefore, considered for the calculation of the relative energy efficiency as a petrol car with a CO_2 emission of 40 + 5 x 17.8 = 40 + 89 = 129 g/km.

Plug-in hybrid passenger cars are considered to be petrol or diesel cars for the purpose of calculating the reference standard because both types of passenger cars emit CO_2 and the sale of new petrol and diesel cars and of new plug-in hybrid passenger cars will no longer be allowed after 2035. In mathematical terms, plug-in hybrid passenger cars could also have been considered to be electric passenger cars for the purpose of calculating the reference standard. In that case, the CO_2 emission of a plug-in hybrid passenger car with the conversion factor of 0.2 would have to been converted into power consumption. The above plug-in hybrid passenger car with a CO_2 emission of 40 g/km and a power consumption of 17.8 kWh/100 km would then have been considered as an electric passenger car with a power consumption of 0.2 x 40 + 17.8 = 8 + 17.8 = 25.8 kWh/100 km for the purpose of calculating the relative energy efficiency. This value would have led to the same relative efficiency for the plug-in hybrid passenger car model in question as if it had been a petrol or diesel car.

The seventh paragraph regulates how the data on length, width, power consumption, CO_2 emissions and hydrogen consumption are taken from the certificate of conformity in order to (be able to) establish the energy label.

The eighth paragraph indicates how the values for dimensions, power consumption and hydrogen consumption are entered accurately (digits after the decimal point) for the purpose of calculating the relative energy efficiency.

Article 3

Article 3(1) states that the constants and values referred to in Article 8(1) of the Decree are the constants $C_{1,\,length}$, $C_{2,\,length}$ and $C_{3,\,length}$ of the regression formula for the average length and the constants C_1, C_2 and C_3 of the regression formula for the average energy consumption. The constants of the average energy consumption regression formula are determined in three different variants: 1) with the caption ‘electric’ for electric passenger cars, 2) with the caption ‘petrol/diesel’ for petrol and diesel cars and 3) with the caption ‘hydrogen’ for hydrogen passenger cars. Finally, these data refer to the value for the total average energy consumption of all cars. This value is again determined in three variants with the three captions mentioned above. See also the definitions in Article 1 for the regression formula for the average length and regression formula for the average energy consumption.

The constants and values referred to in paragraph 1 are necessary for calculating the reference value for the energy consumption. The energy efficiency classes A+++ to G can be determined on the basis of the reference value for each new passenger car model. For each passenger car, the reference value for energy consumption is the weighted average of the value for the relative energy consumption according to the size of the car concerned (weighting 75%) and the value for the total average energy consumption of all passenger cars (weighting 25%). See also Article 2(3), the step under (e). The value for the average energy consumption per the vehicle size of the car in question will be calculated using the regression formula for the average energy consumption. The constants referred to in paragraph 1(b), (c) and (d) will be applied in regression formulas for the average energy consumption. The values referred to in (e), (f) and (g) of paragraph 1 will refer to the value for the total average energy consumption of all passenger cars.

The second paragraph provides that the constants and values referred to in the first paragraph are calculated on the basis of the data of new passenger cars sold in the two calendar years preceding the year in which the constants and values are determined. Models with a length x width greater than 11 m^2 will be excluded from the calculation of constants and values. The constants and values so calculated apply for the two calendar years following the year of determination. In this way, the constants and values of the reference standard for 2026 and 2027 will be established in 2025 on the basis of the passenger cars registered for the first time in 2023 and 2024.

The third paragraph provides that the constants $C_{1,\,length,}$ $C_{2,\,length}$ and $C_{3,\,length}$ of the regression formula for the average length, referred to in the first paragraph, are calculated using the least-squares method (see explanation in a footnote to paragraph 2(3) on the basis of the length, width and the number of new passenger cars sold.

The fourth paragraph determines how the constants $C_{1,\ electric}$, $C_{2,\ electric}$, $C_{3,\ electric}$, $C_{1,\ petrol/diesel}$, $C_{2,\ petrol/diesel}$, $C_{3,\ petrol/diesel}$, $C_{1,\ hydrogen}$, $C_{2,\ hydrogen}$ and $C_{3,\ hydrogen}$ and the values for the power consumption $_{total\ avg.}$, CO_2 emissions $_{total\ avg.}$ and hydrogen consumption $_{total\ avg.}$, referred to in the first paragraph, are found. These are the constants and values of the formulas for the reference standard for electric passenger cars, petrol and diesel cars and hydrogen passenger cars respectively. In the adapted approach for the car label, the energy efficiency of all passenger cars is assessed on the basis of one common reference standard. As provided for in the second paragraph, this common reference standard is derived on the basis of data from all new passenger cars sold. In order to minimise the adjustments to be made to suppliers' software as far as possible, the initial derived reference standard is then expressed in three different units: in power consumption in kWh/100 km for electric passenger cars, in CO_2emissions in g/km for petrol and diesel cars and in hydrogen consumption in kg/100 km for hydrogen passenger cars. See also paragraph 2(3) of the general part.

The constants and values for electric, petrol, diesel and hydrogen passenger cars, respectively, referred to in the fourth paragraph, will be calculated on the basis of the constants $C_{1,\ consumption}$, $C_{2,\ consumption}$ and $C_{3,\ consumption}$ and the value for the consumption $_{total\ avg.}$ of the initial derived common reference standard. Because the common reference standard is derived in kWh/100 km, the constants $C_{1,\ electric}$, $C_{2,\ electric}$ and $C_{3,\ electric}$ and the value for the power consumption $_{total\ avg.}$ are equal to the initial derived constants $C_{1,\ consumption}$, $C_{2,\ consumption}$ and $C_{3,\ consumption}$ and value for the consumption $_{total\ avg.}$. The constants $C_{1,\ petrol/diesel}$, $C_{2,\ petrol/diesel}$ and $C_{3,\ petrol/diesel}$ and the value for the CO_2 emissions $_{total\ avg.}$ for petrol and diesel cars and the constants $C_{1,\ hydrogen}$, $C_{2,\ hydrogen}$ and $C_{3,\ hydrogen}$ and the value for the hydrogen consumption $_{total\ avg.}$ for hydrogen passenger cars are found by multiplying the initial derived constants and value by the reciprocal or reverse value of the conversion factors to the comparison value for energy consumption, namely: 1/0.2 = 5 for petrol and diesel cars and 1/20 = 0.05 for hydrogen passenger cars. These conversion factors are discussed in the fifth paragraph below.

The fifth paragraph provides that the constants $C_{1,\ consumption}$, $C_{2,\ consumption}$ and $C_{3,\ consumption}$ of the initial derived regression formula for the average energy consumption, referred to in the fourth paragraph, are calculated using the least-squares method (see also the explanation in a footnote in paragraph 2(3). The input for this calculation is a file with vehicle data (CO_2 emissions, power consumption, hydrogen consumption, length and width) and numbers of new passenger cars sold, which is made available by the RDW. The data relating to CO_2 emissions, power consumption, hydrogen consumption, length and width are taken from the certificates of conformity of the new passenger cars sold in the previous two years. For petrol, diesel and hydrogen passenger cars, the value for the CO_2 emissions and hydrogen consumption respectively is converted into the value for the energy consumption. The least-squares calculation made with this file provides the values of the constants $C_{1,\ consumption}$, $C_{2,\ consumption}$ and $C_{3,\ consumption}$ of the initial derived regression formula for the average energy consumption. With the values found for the constants, the formula in question is the best approximation for the energy consumption (Y) as a function of the vehicle size (X).

As explained in the general part of the explanatory notes, for petrol and diesel cars, the comparison value for energy consumption is found by multiplying the CO_2 emission expressed in g/km by a factor of 0.2. For a petrol car with a CO_2 emission of 100 g/km, the comparison value for energy consumption will then be 0.2 x 100 = 20 kWh/100 km. For hydrogen passenger cars, the comparison value is found by multiplying the hydrogen consumption expressed in kg/100 km by a conversion factor of 20. A hydrogen passenger car with a consumption of 1 kg hydrogen/100 km would then have a comparator consumption of 20 x 1 = 20 kWh/100 km. For electric passenger cars, the comparison value is equal to the power consumption. For plug-in hybrid passenger cars, the comparison values for CO_2 emissions and power consumption should be added together. All the above-mentioned comparison values are expressed in power consumption (kWh/100 km) for the purpose of a mutual comparison in energy consumption.

The sixth paragraph states that the initial regression formula for the average energy consumption is to be found as the sales-weighted average of the regression lines for the average energy consumption of electric passenger cars, petrol cars, diesel cars and plug-in hybrid passenger cars. The regression line is understood to be the line that represents the regression formula for the average energy consumption. The reason that separate regression lines are derived for electric, petrol, diesel and plug-in hybrid passenger cars is that electric passenger cars, plug-in hybrid passenger cars and diesel cars are on average larger and also more energy efficient than petrol cars. By starting from four separate regression lines, the vehicle size and energy efficiency are considered independently of each other. If a separate fifth regression line can be derived for hydrogen, it will also be included in the determination of the common initial regression formula. There are not yet enough hydrogen passenger car models available for this purpose across the entire size range of car models.

The seventh paragraph states that the value of $\text{consumption}_{\text{total avg.}}$ for the total average energy consumption, referred to in the fourth paragraph, is found to be the average of the comparison values for the consumption, referred to in the fifth paragraph, of all new passenger cars sold. As determined in the fourth paragraph, this initial derived value for total average energy consumption is again expressed in three units: in power consumption in kWh/100 km for electric passenger cars, in CO_2 emissions in g/km for petrol and diesel cars and in hydrogen consumption in kg/100 km for hydrogen passenger cars. The comparison value itself is expressed in power consumption (kWh/100 km) in order to be able to compare the relative energy efficiency of all passenger cars.

STATE SECRETARY FOR INFRASTRUCTURE AND WATER MANAGEMENT – PUBLIC TRANSPORT AND ENVIRONMENT,

C.A. Jansen