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Use of Low-Carbon Technologies on Vehicle Transport

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Abstract: The article discusses the impact of the carbon content of motor fuel on greenhouse gas-carbon dioxide emissions. It has been established that reducing the carbon content of motor fuels through their composition is important in reducing carbon dioxide emissions.

Keywords: low-carbon technology, greenhouse gas emissions, carbon dioxide, carbon dioxide, carbon content, water vapor, ozone layers, motor fuel, petroleum fuel, fuel consumption, emission factor.

Introduction

It is known that the emission of greenhouse gases, mainly carbon dioxide, was limited in 1977 by the UN Kyoto Protocol. Although the greenhouse gases of carbon dioxide contain methane, nitric oxide (N2O), the lower layers of ozone, freons, hydrofluorocarbons (HFC), perfluorocarbons (PFK), sulfur hexofluorite, water vapor play an important role in working with automotive equipment. dioxide (CO2).The share of CO2 in greenhouse gases is about 64% and it has the strongest impact on climate change in the world.

At present, the whole of humanity must realize the harmful effects of greenhouse gases and take all measures to reduce their emissions.

It should be noted that anthropogenic sources of carbon dioxide (combustion of fossil fuels, mining, etc.) are mainly associated with the use of fuels with high concentrations of carbon. In addition, the world's annual consumption of liquid petroleum fuels exceeds 4,300 million tons, and natural gas exceeds 3,200 billion m3.

It should also be noted that there is a certain paradox in the combustion process of internal combustion engines, if theoretically complete combustion takes place, their emissions are greenhouse gases - carbon dioxide and water vapor. In this regard, all measures taken or developed to reduce greenhouse gas emissions should be evaluated throughout their life cycle.

Results and discussion. The solution to the global climate change problem involves a gradual reduction in greenhouse gas emissions, which should be at least 85% by 2050.

The reduction of greenhouse gas-CO2emissions in the field of road transport is due to the use of environmentally friendly technologies and renewable or non-hydrocarbon (low-carbon) energy sources.

In EU countries, the CO2 emission standard for new cars in 2030 should decrease by 37.5% compared to 2021 and reach 130 g / km, which in 2020 should decrease to 95 g / km depending on the weight of the car:

$$BCO2=130+a(M-M0) \text{ , g / km} \quad (1)$$

where M, M0 are respectively equipped and the mass of the reference vehicle. M0 = 1372 kg, a = 0.0457.

As can be seen from the formula, CO2 emissions are largely dependent on the mass of the equipped vehicle or the limited fuel consumption.

In this regard, the full use of low-carbon technology in road transport is the most important at the current stage of implementation of measures to reduce CO2 emissions.

Thus, radical measures (use of fuel (energy) that reduces or does not produce CO2; increase the efficiency of fuel (energy) used; reduce fuel (energy) consumption) before reducing CO2 emissions in the road sector. during transportation, it is advisable to comprehensively expand the use of low-carbon technology.

Low-carbon technology in motor vehicles is associated with the use of petroleum and alternative motor fuel components (Table 1).

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Table 1 Composition of petroleum and alternative engine fuels

№	Fuel name	Component composition			Consumption, kg (α = 1)		CO_2 emission, kg	ratios	
		C	H	O	air	oxygen		C/H	H/C
1	Diesel fuel	87.36	12.60	0.04	14.4	3.31	3.16	6.9	1.8
2	Petrol	85.5	14.5	-	14.85	3.41	3.1	5.93	2.0
3	Compressed natural gas	74.6	25.4	-	17.0	3.91	2.8	2.97	4.0
4	Liquefied petroleum gas	81.7	18.3	-	15.65	3.55	3.0	4.9	2.6
5	Methanol	37.5	12.6	49.9	6.5	1.50	1.37	2.98	4
6	Ethanol	52.2	13	34.8	9.0	2.07	0.96	1.67	3.0
7	Butanol	51.9	0.85	29.6	11.2	2.55	0.59	4.8	2.5
8	Dimethyl ether	52.2	13.0	34.8	9.06	1.92	1.84	4	3.0
9	Biodiesel	77	13	10	12.5	2.52	1.6	5.92	1.68
10	Hydrogen	-	100	-	38	8	-	-	-

In world practice, the calculation of CO_2 emissions during the operation of vehicles can be made depending on the amount of fuel consumed or on the mileage of the vehicle.

Modern car manufacturers for their cars give fuel consumption (l / 100km) and CO_2 emissions (g / km) for various operating modes - urban, suburban and mixed cycles, as well as indicating the type of installed gearbox.

The average statistical data, as well as the calculations performed, show that CO_2 emissions directly depend on fuel consumption.

Table 1 Relationship between CO_2 emissions and fuel consumption

№	Type of fuel	Conversion of the unit of fuel consumption per 100 km of mileage to CO_2 emissions, g / km CO_2	Conversion of CO_2 emission unit per km of run to fuel consumption, l / 100km	Conversion of fuel consumption in liters to equivalent CO_2e emissions, kg / CO_2e
1	Diesel fuel	26.5	0.0377	2.5839
2	Petrol	23.2	0.0431	2.1944
3	CIS	19	0.05263	1.50938
4	LNG	18.99	0.0526	1.5

According to the data in Table 2, it is possible to calculate CO_2 emissions for passenger cars, for which fuel consumption is indicated (Table 3).

Table 3 The relationship between the CO_2 emission rate and fuel consumption on the example of a SKODA oktova car

№	Stamps	Fuel consumption l / 100km	CO_2 emissions, t / km
1	1.4 TSI, 6-ступ. МКП/150 л.с.	5.4	125
2	1.4 TSI, 7-ступ. DSG/150 л.с.	5.3	124
3	1.4 TSI, 6-ступ. МКП/110 л.с.	4.9	114

Many EU countries have adopted the NEDC driving cycle emissions estimate, where fuel consumption is measured at the same time.

Table 4 shows the specified data for some vehicles as an example.

Table 4 Estimated CO_2 emissions and fuel consumption over the NEDC driving cycle

№	Vehicle type	Fuel consumption by driving cycle, l / 100km			CO_2 emissions, (combined), g / km
		Town	country	mixed	
1	Continental GT Convertible	17.2	9.4	12.3	280
2	Flying Spur VP S	15.9	8.0	10.9	254
3	Mulsanne	24.3	11.0	15.9	350

Based on the foregoing, it follows that constructive-technological, technical, production, organizational measures to reduce fuel consumption must be implemented at the stage of design, production, operation and disposal of the vehicle, in the full life cycle. Ultimately, the comparison of CO_2 emissions must be taken into account at all stages and added up for the entire life cycle.

Typically, when using different fuels for comparison, CO_2 emission factors are calculated using the formula:

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$$EFCO2,j,y=WCj,y*3.664 \quad (2)$$

where EFCO2,j,y is the combustion emission factor; j - fuel for the period y, tCO2 / t; - carbon content in j - fuel for the period y, tC / t; 3.664 - conversion factor, tCO2 / tC.

Conclusion. When evaluating the use of low-carbon technology in vehicles or motor fuels with different carbon contents, a CO2 emission factor should be calculated.

List of used literature:

1. Timothy T. Maxwell, Sesse C. Sones. Alternative fuels: emissions, economics and performance. SAE, 1994. – 143 p.
2. Bazarov B.I., Kalauov S.A., Vasidov A.Kh. Alternative motor fuels. - Tashkent: SHAMS ASA, 2014 - 189 p.
3. Erokhov V.I. Toxicity of modern cars. Methods and means of reducing harmful emissions into the atmosphere. - M .: FORUM INFRA-M, 2013 - 448 p.
4. Yarmukhamedov Kh.Kh. Usmanov I.I., Sidikov F.Sh., Alimov Sh.I. Improving the system for assessing the impact of vehicles on the environment // Ecological Bulletin, No. 11, 2016. - P. 31-32
5. GOST P 56267-2014 / TR 14069 Greenhouse gases. Determination of the amount of greenhouse gas emissions in organizations and reporting. Guidance on the application of ISO 14064-1
6. Ben Daley. Air transport and the environment. ASHGATE, 2010. – 27 p.
7. Ian J. Laurenzi et al. Lite cicle greenhouse gas emissions and freshwater consumption associated with Bakken tight oil // PNAS, 14. – 2016. E7672-E7680.
8. Guidelines for National Greenhouse Gas Inventories. IPCC, 2006- 36 p.
9. Manzanera M. Alternative fuel. In Tech, 2011. – 346 p.
10. Sunggyu Lee, James G et al. Handbook of alternative fuel technologies. – London: CRC Press, 2015. – 523 p.

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