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APPROACHES TO REGULATION OF CO_2 EMISSION AND ENERGY CONSUMPTION INDICATORS OF NEW LIGHT DUTY VEHICLES IN UKRAINE

Alexey Klimenko, Ph.D., State Enterprise State Road Transport Research Institute, Kyiv, Ukraine, aklimenko.insat@gmail.com, orcid.org/0000-0002-2323-6839
Nikolas Hill, Associate Director, Knowledge Leader, Ricardo Energy & Environment, Oxfordshire, United Kingdom, nikolas.hill@ricardo.com, orcid.org/0000-0003-4585-5144
Elisabeth Windisch, Ph.D., OECD, Paris, France, elisabeth.windisch@itf-oecd.org, orcid.org/0000-0003-2791-0912.

ПІДХОДИ ДО РЕГУЛЮВАННЯ ПОКАЗНИКІВ ВИКИДІВ CO_2 ТА ЕНЕРГОСПОЖИВАННЯ НОВИХ ЛЕГКОВИХ АВТОМОБІЛІВ В УКРАЇНІ

Клименко О.А., кандидат технічних наук, ДП «ДержавтотрансНДІпроект», Київ, Україна, aklimenko.insat@gmail.com, orcid.org/0000-0002-2323-6839
Ніколас Хілл, заступник директора, лідер знань, Ricardo Energy & Environment, Оксфордшир, Великобританія, nikolas.hill@ricardo.com, orcid.org/0000-0003-4585-5144
Елізабет Віндіш, Ph.D., OECD, Париж, Франція, elisabeth.windisch@itf-oecd.org, orcid.org/0000-0003-2791-0912.

ПОДХОДЫ К РЕГУЛИРОВАНИЮ ПОКАЗАТЕЛЕЙ ВЫБРОСОВ CO_2 И ЭНЕРГОПОТРЕБЛЕНИЯ НОВЫХ ЛЕГКОВЫХ АВТОМОБИЛЕЙ В УКРАИНЕ

Клименко А.А., кандидат технических наук, ГП «ГосавтотрансНИИпроект», Киев, Украина, aklimenko.insat@gmail.com, orcid.org/0000-0002-2323-6839
Николас Хилл, заместитель директора, лидер знаний, Ricardo Energy & Environment, Оксфордшир, Великобритания, nikolas.hill@ricardo.com
Элизабет Виндиш, Ph.D., OECD, Париж, Франция, elisabeth.windisch@itf-oecd.org, orcid.org/0000-0003-2791-0912.

Introduction

Ukraine, being an Annex I Party to the United Nations Convention on Climate Change, submitted in 2015 its Intended Nationally Determined Contribution with commitment to not exceeding 60% of the country's 1990 greenhouse gases (GHG) emissions level in 2030.

But it should be noted that already achieved significant reduction of GHG emissions by Ukrainian economy since 1990 is predominantly the result of economic decline, and in much less extent can be considered as a result of systematic actions directed at improving energy efficiency and sustainable development to meet the needs of the economy and society.

Fulfillment of these ambitious international commitments without strong systematic measures to significantly improve energy efficiency in many sectors of the economy can be a significant barrier to recovery and further development of the national economy and to improve the living standards of citizens of Ukraine.

Road transport in Ukraine has presuppositions for significant increase its relative share in total energy consumption and GHG emissions by the country, taking into account deindustrialization processes and huge potential capacity of the private car market (Ukraine's level of motorization by the number of cars per 1000 inhabitants are several times smaller than in many members of the EU). Namely road transport can become one of the main problems for achieving the aforementioned international obligations of Ukraine.

According to the Association Agreement between the European Union and its Member States, on the one hand, and Ukraine, on the other hand, Ukraine committed to improve and develop national policy on the regulation of CO_2 emissions and energy consumption in the area of road transport.

Moreover, improving energy efficiency of road transport (as dominated consumer of motor fuels) can be considered as important aspect of national energy security policy.

In line with Ukraine's above mentioned commitments, the Clima East project "Development of potential in the elaboration of National policy on regulation of CO_2 emissions and energy consumption by

road transport" [1] was implemented in 2016 with the main objective to assist the Ministry of Infrastructure of Ukraine to enhance its understanding and capacity in the area of GHG emissions regulation in the road transport sector and to contribute to the development of road transport policy measures that can help achieve national and global GHG emission reduction targets.

Share of CO_2 emission from Light Duty Vehicles (LDV) in Ukraine (LDV considered here comprising of passenger cars and Light Commercial Vehicles (LCV)) increased from 21% in 1990 up to 53% in 2015 of road transport total CO_2 emission, as derived from the last reconstruction of Ukrainian road transport fleet structure and fuel consumption, performed in [2].

Regulation of CO_2 emission and energy consumption of new LDV in Ukraine becoming increasingly important measure that should be implemented first of all taking into account positive experience of other countries around the world in this field and relatively easy to afford technical instruments (equipment) and methods used to determine CO_2 emission and energy consumption indicators of LDV.

In the same time there are general around the world and also specific to Ukraine obstacles for technical regulation in this field that are discussed below.

Regulation in this field for Heavy Duty Vehicles (HDV) and other categories of vehicles, as well as discussion of other numerous policies aimed to reduce fossil fuel consumption and CO_2 emission deserves separate publications being far beyond the scope of this article.

Here are briefly outlined the main findings of above mentioned research project [1] (it was executed by authors of this article as international team of the Ricardo Energy & Environment (United Kingdom) for the Clima East project) as well as recently updated data in part of regulation of CO_2 emission and energy consumption indicators of new LDV. The directions of further research in this field in the State Enterprise State Road Transport Research Institute (Ukraine) are also outlined.

Disclaimer

Mentioned report within research [1] has been produced with the assistance of the European Union. The contents of this report and this article are the sole responsibility of the authors and can in no way be taken to reflect the views of the European Union.

Summary review of the currently in place and proposed future methods and regulatory systems used in different regions for determination and regulation of CO_2 emission and fuel consumption of LDV

LDV`s fuel consumption and CO_2 emission indicators as well as other pollutants specific emission determination based today predominantly on a laboratory test cell testing in so called driving cycles, using basically a chassis dynamometer to simulate vehicles' inertia mass and resistance to movement, and an emission mass measurement system including constant volume sampling system and analytical systems to measure gaseous substances as well as PM emission in exhaust.

Vehicles are operated virtually, as on a road, via a prescribed speed vs. time pattern of a driving cycle with unified temperature and other conditions. The objective of driving cycle usually considered as to reproduce some part of a vehicle's real driving conditions in a uniform, strictly predefined and reproducible way.

Fuel consumption is measured by a carbon balance method in accordance with the standards. That is without device (flowmeter) to measure fuel consumption directly in a fuel supply line. Instead of this it is used mass emission measurement of carbon containing gaseous components in exhaust, giving opportunity to calculate consumption of fuel with known properties, including carbon content.

There are currently a wide range of different driving cycles applied in different areas of world for testing LDV regarding CO_2 and fuel consumption. In addition to official driving cycles used for technical regulation purposes, it is developed for the time being a very wide variety of special driving cycles for research purposes within different projects.

The differences in driving cycles` patterns and other conditions of test procedures and their incompatibility considered as significant problem for potential regulation in Ukraine, where vehicles today are predominantly imports from different regions of the world applying different standards.

Listed below the main standards for LDV`s fuel consumption and CO_2 emission regulation historically originated from the primary regions of road vehicles production and sales, concentrated in Europe, USA, Japan and China.

European Union

So called New European Driving Cycle (NEDC) maintained by the UNECE World Forum for Harmonization of Vehicle Regulations (WP.29) and serves more than 2 decades as basis for EU type approval testing of emissions (CO_2 and other air pollutants) and fuel consumption from LDV, including also

measurement of electric energy consumption and electric range in hybrid and fully electric M1 and N1 categories of vehicles.

The NEDC consists of four segments of the Urban Driving Cycle, designed initially to represent driving conditions for average European city, and the Extra Urban Driving Cycle to reflect high-speed driving modes.

The cycle starts on a cold vehicle at 20–30 °C means that the NEDC implicitly weighs the cold start effect at 100%. The cycle is also used as a basis for official type-approval emission and fuel consumption figures in other regions of the world.

At present LDV has been subject of CO_2 emission regulations in Europe since 2009 (for passenger cars) and since 2011 for LCV. Targets are mass-based.

The NEDC cycle is a subject of significant criticism among expert community and vehicle owners since does not represent adequately the actual driving and fuel consumption and CO_2 emission behavior of vehicles in many cases. Similar concerns have also been raised with regards to air quality pollutant emissions.

Another well-known concern is that the cycle's pattern is relatively easy to use by manufacturer for automated recognition by ECU's (engine control unit) software, potentially allowing for closer artificial adjustment to strictly predefined conditions in laboratory, and different ECU settings for real world driving, that gives opportunity to omit emission standards in favor of other and more attractive for customer features of vehicle including engine torque curve and vehicle acceleration behavior or very good fuel economy figures that can lead to significant excess of NOx emission limits settled by the legislation. The recent and ongoing diesel emissions scandal with VW group has only heightened such concerns and can be considered as «the tip of the iceberg».

Evidence for such concerns appears to be provided in recent comparisons of official fuel consumption and CO_2 emissions figures and those found in real-world conditions [3]. In part due the above reasons, the European Union is currently close to finish its long path to completely replace the NEDC and the associated test-procedure by a new Worldwide harmonized Light vehicles Test Cycle (WLTC) and the associated Worldwide Harmonized Light Vehicle Test Procedure (WLTP).

The current 2021/2020 regulatory CO_2 targets for passenger cars and LCVs are set relative to the NEDC-based values. Therefore a range of work has been carried out, and is ongoing, investigating the correlation between results from the two cycles and overall test procedures, the potential implications of the change in this regard and options for monitoring and assessing compliance with the regulation following the change. And it was decided to apply vehicle-specific NEDC-WLTP correlation factors for vehicles, tested in accordance to WLTP [4], [5], [6]. The CO2MPAS software tool was developed for determination of these correlation factors [7].

Now European Union is on the way of establishment of 2020-2030 CO_2 emission standards for new LDV based on WLTP [5]. In accordance to recent decision of Council of the EU, new cars will emit on average 15% and 37.5% less CO_2, by 2025 and 2030 respectively, compared to the current emission standard limits. For vans, the target is the same 15% reduction for 2025, but is 31% for 2030 [8].

United States of America

In the USA, there are two sets of standards, the Corporate Average Fuel Economy (CAFE) (in miles per gallon, mpg) standards adopted by the NHTSA and GHG emission standards (in CO_2 equivalents, also including CH_4 and N_2O) adopted by the EPA [9]. The standards set targets for LDVs (cars and light duty trucks) as well as Medium Duty Passenger Vehicles. The CAFE standards were first adopted in 1975, and were significantly tightened in 2007 under the Energy Independence and Security Act (EISA), as well as the separate introduction of GHG standards under the Clean Air Act (CAA) in the same year.

The fuel economy measurement method in the US is prescribed in 40 CFR Part. 600. For up to MY (model year) 2010 the CAFE standards and label requirements in the US consist of city (FTP75) and highway (HWFET) test results with weighting factors 0.55 and 0.45 respectively to calculate the combined average value from the two cycles: 1) the "city" cycle EPAIII also known as FTP75 (Federal Test Procedure) is used for emission certification and fuel economy testing of LDV comprising a number of phases, which are collected and analysed separately before being combined using prescribed weighting factors; 2) the Highway Fuel Economy Test (HWFET or HFET) consisting of hot start driving schedule developed by the EPA for the determination of the highway fuel economy rating.

Starting from 2008-2010 as option and introduced for MY 2011 and beyond the combined fuel economy value is calculated on a 5 cycle formula based upon combination of above mentioned FTP75, HWFET plus cold FTP(20F), US06 and SC03 (nevertheless at present above prescribed 2 cycle calculation remains as option also).

The cold FTP(20F) cycle is cold exhaust emissions test designed to simulate the cold start and operation of vehicles in cold climate areas (20°F or -6.7°C) and uses the same FTP75 driving schedule. Driving schedule of the US06 cycle is also known as the Supplemental FTP Driving Schedule (high speed/high load cycle). SC03 is the Air conditioning cycle.

The standards are based on CO_2 emissions-footprint curves (i.e. different from the mass-based approach in the EU), so that each vehicle has a different compliance target based on its 'footprint' value.

California (via the California Air Resource Board, CARB) previously has been granted a waiver to also have its own, tighter, CO_2 equivalent emission targets for passenger cars and LCV, but GHG regulations have been harmonised with the EPA from 2017-2025.

Japan

Japanese emission regulation and fuel economy was based upon the 10-15 mode driving cycle. This is a 'hot cycle', meaning preliminary run a vehicle to warm up without measurements, prior to starting the cycle. The current JC08 cycle was introduced in 2005 into Japanese emission regulation and fuel economy determination and was fully phased-in by October 2011. Under the revised protocols, measurement is made twice, with a cold start being weighted by 25% and a hot start being weighted by 75%.

Japanese fuel economy (km/l) targets for the period up to 2010 were based upon a weighted average for all manufacturers in Japan. Targets were set separately for gasoline, diesel and LPG passenger cars and for different weight categories. The 2015 fuel economy (km/l) standard cover average and vehicle weight based targets for passenger cars, LCVs and small buses.

Japan is going to finish of the replacement of aforementioned national test procedures to WLTP in 2019.

China

Automotive fuel consumption regulation in China began in 2004 with the national standard of "Limits of Fuel Consumption for Passenger Cars" (GB 19578-2004), targeting an average fuel consumption of 6.9L/100km by 2015 which is equivalent to CO_2 emissions of 167 kg/km. The testing standard for LDV fuel economy is the national standards/ "GuoBiao" No. 19233 and fuel consumption and emissions are determined in China using the NEDC. Under the standard, for Phase III onwards, separate limit values are applied to 16 different mass categories for passenger cars (lower bound 750kg, upper bound 2.5 tonnes unladen kerb weight). LCVs (N1 category) are covered under GB 20997-2007 and have 4 mass categories (on a gross vehicle mass basis, up to 3.5 tonnes), and separate targets for gasoline and diesel vehicles.

The current standard (for Phase III, up to 2015/16), which also includes per-vehicle limit values, was established by GB27999-2011, and includes overall fleet average targets for the national corporate-average fuel consumption (CAFC), based on a sales weighted average across all models. The CAFC requirement was enacted in 2012 and allows automotive manufacturers until 2015 to gradually reduce their fuel consumption levels and meet the target, towards the CAFC binding period starting in 2015 [10]. The Chinese government has also set targets to reduce the average fuel consumption further to about 5 litres/100km (equivalent to 120g CO_2/km) by 2020 (as updated under GB 27999-2014 for Phase IV).

Other regions

Most of the other world regions have testing protocols and standards based around those used in the major world regions. For example, Canada's Company Average Fuel Consumption (CAFC) program was introduced in 1976 to track the fuel consumption of the new light duty vehicle fleet. CAFC is similar to the U.S. CAFE program with the exception that the CAFC program does not distinguish between domestic and imported vehicles. The fuel consumption goals set out by the program have historically been equivalent to CAFE standards [11]. Similarly, in South Korea the LDV GHG emission and fuel economy targets are also based on US driving cycles [9].

Worldwide harmonization

The WLTC is being developed by the UN ECE GRPE (Working Party on Pollution and Energy) group, with the predominant participation of European, Japanese and Indian experts) within the framework of the Worldwide harmonized Light vehicles Test Procedure (WLTP) as replacement the European NEDC procedure for type approval testing. The WLTP will therefore gain high importance on a global level as it is expected that other countries will also adopt WLTP in the future.

The WLTP procedure consists of three test cycles designed for vehicle categories of different power-to-mass ratios (PMR) and taking in to account the maximum speed of the vehicle. The PMR parameter is defined as the ratio of rated power (W) to curb mass (kg).

Incompatibility of the standards for determination of CO_2 emission and fuel consumption of LDV

A great difference exists around the world in vehicle specifications ranges on different markets, traffic and weather conditions, driving habits, etc.

In efforts to establish emission and fuel consumption evaluation base that reflects local real world driving conditions different countries have developed its own unique test procedures. And there are significant differences among known around the world cycles regarding the vehicle speed and acceleration pattern as well as engine rpm and loads, starting conditions, number of stop phases in a cycle, etc., resulting incompatibility of the same vehicle`s fuel economy (or emission, including GHG) representation within different standards [12].

The development of a reliable set of test cycle conversion factors is highly questionable due to the various factors with complicated influence, and would provide a significant level of uncertainty for the results.

In addition to problem of diversity in test procedures it also should be noted a different base approaches to regulate fuel economy and GHG emissions have established around the world.

Off-cycle / real-world emission considerations

The off-cycle / real-world emission problem can be considered throughout imperfection of vehicle and engine test procedures regarding obtained values of emission and fuel consumption, resulting not only in the divergence from average real operating conditions, but in principal opportunities for manufacturers to present a misleading picture to consumers, and the state as a regulator, with aim of fulfilling legal requirements at the lowest cost and/or gain a competitive advantage in the market [1].

Due to practically infinite set of variations in driving and ambient conditions, vehicle features and driving behavior, precise definition of real-world driving is elusive on practice. And this is the fundamental problem in vehicle emission and fuel consumption regulation design.

In contrast to the diversity of reality, standardized testing procedures cover only a part of this, and contain a substantial number of predefined conditions that can often be well controlled by manufactures to gain competitive advantage in the marketplace. Recent research results, including from [3] has shown a significantly increasing divergence over time of regulatory values for CO_2 emissions from passenger cars in Europe, in comparison with real-world data.

The off-cycle/real-world emission problem is a significant impediment to effective regulation of CO_2 emission by road vehicles.

Current situation and summary assessment of the suitability of different options for Ukraine regarding LDV

According to Ukrainian legislation, at present for newly registered LDV of categories M1 and N1 the CO_2 emission and fuel consumption should be measured (except the case of “individual” import or second-hand vehicles), but do not yet regulated.

Ukraine is not a large market, so practically it would be potentially difficult to set the industry-wide targets during design phase for imported production. However, it would perhaps not be impossible if considering regulation from the point of view of complimentary policy, including vehicle efficiency labeling, graduated vehicle tax levels, penalties for not meeting emission/fuel consumption targets, etc.).

But the introduction of technical regulations on the CO_2 emissions in Ukraine for new LDVs are not currently possible by direct implementation of the current European approach, and would require significant work to move forwards to a position where above mentioned mechanisms might potentially be implemented.

Proposals for the design of a combined policy approach regarding vehicle’s GHG regulation in Ukraine, taking in to account Ukrainian specific conditions, are set out below.

Overall conclusions and recommendations for Ukraine

The following main principles for regulation of CO_2 emission and energy consumption indicators of new LDV in Ukraine are therefore assumed in [1]:

1. Regarding fuel economy direct technical regulation (i.e. standards used on a vehicle design phase), realistically Ukraine can rely mainly on already existed standards and produced vehicle types around the world, with focus on European requirements first of all.

2. The direct technical regulation of vehicles’ fuel economy (fuel economy standards) or CO_2 emissions could be introduced based on European standards first of all, and taking in to account Global Technical Regulations testing procedures potential as well where it is appropriate. Only LDV (PC & LCV) can be considering as affordable and reasonable for direct technical regulation of fuel economy in Ukraine at this time. In EU, in order to do not restrict the range of PC & LCV that could be put on the market, CO_2 emissions regulated via complicated annual fleet-average CO_2 target for manufacturer, included a range of

utility functions, flexibilities and derogations (e.g. for niche manufacturers). These elements cannot be directly introduced to Ukraine, since Ukraine is not part of the EU, and it is not possible to establish reliable mechanisms to control the import of vehicles into the country in such a manner.

3. Instead of this, another option that might be considered for Ukraine would be to set "individual" (i.e. disregarding total annual production/import/registration structure of an automaker) performance targets, followed by "average" CO_2 performance regulation in Ukraine initially, which would set minimum performance criteria for different vehicle types.

4. Such "individual" standards (being differentiated by vehicle mass or footprint, and potentially class, designation, etc.) for fuel consumption and/or CO_2 emission norms could be established on the basis of EU regulations and adapted to Ukraine's own needs and the market situation. Such fuel economy norms could be established in a way based on a reasonable balance between general targets for CO_2 emission reduction and the range of vehicles that could be realistically put on the market and/or to be in demand on the market of Ukraine.

5. In principal, the norms should be mandatory though it may be necessary to provide for some exceptions for particular vehicle types (e.g. racing cars for instance, etc.). Such exceptions could be handled also via punitive financial sanctions (like in EU) on a progressive scale to establish the framework of fiscal measures linked to labelling of fuel economy and CO_2 emissions.

6. Since there are likely to be some restrictions in the way of direct CO_2 emission targets (norms) for manufacturers might be implemented from the point of view of regulation, it will be beneficial to provide national fuel efficiency and CO_2 emissions labelling requirements also. As well as for LDVs, this should ideally be applied also to Heavy Duty Vehicles (HDV) and Power Two Wheelers (P2W). This system would also benefit with links to fiscal measures, such as graduated road and/or ownership/purchase taxes based on performance (and depending of vehicle type and destination). This will also help to stimulate customer demand in favor on more fuel efficient vehicle choices.

7. Such combined fuel economy labelling and fiscal measures one might be considered as similar to fuel economy regulations in combination with punitive financial sanctions (depending on the levels set). The principal difference here that while fuel economy labelling and fiscal measures cover all vehicle variations / options available on the market with gradual or relatively "soft" in some range scale of taxes, the "individual" fuel economy norms and punitive fiscal measures would provide a clear target (limit) and operate only when this target is not fulfilled.

8. In order to reduce the negative impacts of "off-cycle" / "real-world" emission performance issues may be to establish additional specific tests of vehicles to account for additional fuel consumption not captured by existing and widely used standards during product certification. Such additional tests and gathered information might be used for instance to provide a calibration factor to adjust original test-cycle based figures to better represent real-world conditions. Such information would give to customer a better estimate regarding a vehicle's fuel economy in real life, helping them to make a more informed choice.

9. In designing a regulation scheme, it may be important to account for different original markets (and their requirements) which are the sources of supply of different kind of vehicles to Ukraine. Vehicles can be imported in Ukraine in different ways, e.g. by importing party for subsequent sale or imported individually, be new or second-hand vehicles. One of these imported parties may have some fuel economy data to be subject available for clear regulation, the other vehicles likely not.

10. To overcome the problem where there are no appropriate technical data established for CO_2 emission regulation for the case of individual or very small numbers of annual imports certain vehicles, and where it is not feasible to test vehicle from economy point of view, on option could be to determine an approximate figure based on a standard algorithm based on a limited number of vehicle parameters. However, this is likely to pose its own problems and so derogations for such cases might be more appropriate in cases where it is applied in the EU for niche manufacturers.

11. In addition, it should be noted, that LDVs and HDVs as well as P2Ws fuel consumption / CO_2 emission tests should be carried out at the same time as toxic pollutants simultaneous measurement/control.

12. Regarding LDVs it is assumed that the preferable way would be to consider WLTP-based emissions and the EU's policy based regulation, but with "individually" acting and "soft" CO_2 emission norms (limits) designed to take into account national specific conditions. LDV labelling should be established to include simultaneously information on fuel economy (as this is clear for customer) and also CO_2 data metrics. In addition to WLTP specific values (which should help provide a better comparative vehicle-to-vehicle basis than NEDC), it might be useful to consider a limited programme of national fuel economy testing in a common system, in order to develop real-world calibration/adjustment factors to apply to the WLTP figures, in a similar way as is done in the US official fuel economy figures. This could also

help improve consumer confidence in the "official" CO_2 / fuel consumption figures, which have become undermined in the EU due to the significance to type approval figures. The final figures would therefore be based on chassis dynamometer complete vehicle testing within standard LDV emission test procedure, producing as metrics the specific fuel consumption in l/100 km, and CO_2 emissions of a vehicle, measured in gCO_2/km.

Further research activities in this field at the State Enterprise State Road Transport Research Institute are focused for the time being, but are not limited to, the following directions:

1. Investigation of the influence of constructive and operational factors on fuel efficiency indicators of wheeled vehicles.

2. Developing of the set of fuel economy indicators (and the methodological approaches to determine them on practice) that might better reflect a variety of real-world conditions including Ukrainian national circumstances.

3. Developing of concrete proposals (including draft legislation) to establish in Ukraine national system of regulation of CO_2 emission and energy consumption indicators of new LDV from the point of view of complimentary policy, including vehicle efficiency labeling, graduated vehicle tax levels, penalties for not meeting emission/fuel consumption targets, etc.

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ABSTRACT

Alexey Klimenko, Nikolas Hill, Elisabeth Windisch. Approaches to regulation of CO_2 emission and energy consumption indicators of new light duty vehicles in Ukraine. Visnyk National Transport University. Series «Technical sciences». Scientific and Technical Collection. – Kyiv: National Transport University, 2019. – Issue 1 (43).

The article briefly presents the main findings of the Ricardo Energy & Environment (United Kingdom) research team within the Clima East project "Development of potential in the elaboration of National policy on regulation of CO_2 emissions and energy consumption by road transport" in part of regulation of CO_2 emission and energy consumption indicators of new LDV.

Above mentioned project was implemented with the main objective to assist the Ministry of Infrastructure of Ukraine to enhance its understanding and capacity in the area of GHG emissions regulation in the road transport sector and to contribute to the development of road transport policy measures that can help achieve national and global GHG emission reduction targets.

It is shown that regulation of CO_2 emission and energy consumption of new LDV becoming increasingly important measure that should be implemented in Ukraine in order to fulfill the countries` ambitious international commitments regarding limitation of greenhouse gases (GHG) emissions without creating a barrier to recovery and further development of the national economy.

The article gives summary review of the currently in place and proposed future methods and regulatory systems used in different regions for determination and regulation of CO_2 emission and fuel consumption of LDV, including such key markets as European Union, United States, Japan, China, covering worldwide harmonization trends, aspects of incompatibility of the standards for determination of CO_2 emission and fuel consumption of LDV, the off-cycle/real-world emission problem as a significant impediment to effective regulation of CO_2 emission by road vehicles.

It is shown that the introduction of technical regulations on the CO_2 emissions in Ukraine for new LDVs are not currently possible by direct implementation of the current European approach. Proposals for the main principles of the design of a combined policy approach regarding vehicle's GHG regulation in Ukraine, taking in to account the country specific conditions, are outlined.

The directions of further research in this field in the State Enterprise State Road Transport Research Institute are also outlined.

KEY WORDS: LIGHT DUTY VEHICLES, ENERGY CONSUMPTION INDICATORS, CO_2 EMISSION REGULATION

РЕФЕРАТ

Клименко О.А. Підходи до регулювання показників викидів CO_2 та енергоспоживання нових легкових автомобілів в Україні / О.А. Клименко, Ніколас Хілл, Елізабет Віндіш // Вісник Національного транспортного університету. Серія «Технічні науки». Науково-технічний збірник. – К.: НТУ, 2019. – Вип. 1 (43).

У статті стисло викладено основні висновки дослідницької групи Ricardo Energy & Environment (Великобританія) у рамках проекту Clima East «Розвиток потенціалу у розробці Національної політики щодо регулювання викидів CO_2 та споживання енергії автомобільним транспортом» в частині регулювання показників викидів CO_2 та енергоспоживання нових легкових автомобілів.

Вище згаданий проект був реалізований з головною метою надання допомоги Міністерству інфраструктури України в підвищенні його розуміння та спроможності у сфері регулювання викидів парникових газів у секторі автомобільного транспорту та сприяння розробці заходів щодо

автомобільного транспорту, які можуть допомогти досягти національних та глобальних цілей скорочення викидів парникових газів.

Показано, що регулювання викидів CO_2 та споживання енергії новими легковими автомобілями стає все більш важливим заходом, який слід впровадити в Україні для виконання амбітних міжнародних зобов'язань країни щодо обмеження викидів парникових газів, не створюючи при цьому перешкод для відновлення та подальшого розвитку національної економіки.

У статті наводиться короткий огляд наявних технологій та запропонованих майбутніх методів та регуляторних систем, що використовуються в різних регіонах для визначення та регулювання викидів CO_2 та споживання палива легковими автомобілями, включаючи такі основні ринки, як Європейський Союз, США, Японія, Китай, охоплюючи світові тенденції гармонізації, аспекти несумісності стандартів для визначення викидів CO_2 та споживання палива легковими автомобілями, проблему поза циклових викидів, як значну перешкоду для ефективного регулювання викидів CO_2 автотранспортом.

Показано, що впровадження технічних регламентів щодо викидів CO_2 в Україні для нових легкових автомобілів в даний час є неможливим шляхом прямого впровадження поточного європейського підходу. Викладено пропозиції щодо основних принципів розробки комбінованого політичного підходу щодо регулювання викидів парникових газів автомобільним транспортом в Україні, беручи до уваги специфічні умови країни.

Також викладено напрями подальших досліджень ДП «ДержавтотрансНДІпроект» у цій галузі.

КЛЮЧОВІ СЛОВА: ЛЕГКОВІ АВТОМОБІЛІ, ПОКАЗНИКИ СПОЖИВАННЯ ЕНЕРГІЇ, РЕГУЛЮВАННЯ ВИКИДІВ CO_2.

РЕФЕРАТ

Клименко А.А. Подходы к регулированию показателей выбросов CO_2 и энергопотребления новых легковых автомобилей в Украине / А.А. Клименко, Николас Хилл, Элизабет Віндіш // Вестник Национального транспортного университета. Серия «Технические науки». Научно-технический сборник. – К.: НТУ, 2019. – Вип. 1 (43).

В статье кратко изложены основные выводы исследовательской группы Ricardo Energy & Environment (Великобритания) в рамках проекта Clima East «Развитие потенциала в разработке Национальной политики по регулированию выбросов CO_2 и потребления энергии автомобильным транспортом» в части регулирования показателей выбросов CO_2 и энергопотребления новых легковых автомобилей.

Вышеупомянутый проект был реализован с главной целью оказания помощи Министерству инфраструктуры Украины в повышении его понимания и возможностей в сфере регулирования выбросов парниковых газов в секторе автомобильного транспорта и содействия разработке мер в отношении автомобильного транспорта, которые могут помочь достичь национальных и глобальных целей сокращения выбросов парниковых газов.

Показано, что регулирование выбросов CO_2 и потребление энергии новыми легковыми автомобилями становится все более важным мероприятием, которое следует внедрить в Украине для выполнения амбициозных международных обязательств страны по ограничению выбросов парниковых газов, не создавая при этом препятствий для восстановления и дальнейшего развития национальной экономики.

В статье приводится краткий обзор имеющихся технологий и предлагаемых будущих методов и регуляторных систем, используемых в различных регионах для определения и регулирования выбросов CO_2 и потребления топлива легковыми автомобилями, включая такие основные рынки, как Европейский Союз, США, Япония, Китай, охватывая мировые тенденции гармонизации, аспекты несовместимости стандартов для определения выбросов CO_2 и потребления топлива легковыми автомобилями, проблему вне цикловых выбросов, как значительное препятствие для эффективного регулирования выбросов CO_2 автотранспортом

Показано, что внедрение технических регламентов по выбросам CO_2 в Украине для новых легковых автомобилей невозможно в настоящее время путем прямого внедрения европейского подхода, используемого сегодня. Описаны предложения к основным принципам разработки комбинированного политического подхода к регулированию выбросов парниковых газов автомобильным транспортом в Украине с учетом специфических условий страны.

Также изложены направления дальнейших исследований ГП «ГосавтотрансНИИпроект» в этой области.

КЛЮЧЕВЫЕ СЛОВА: ЛЕГКОВЫЕ АВТОМОБИЛИ, ПОКАЗАТЕЛИ ПОТРЕБЛЕНИЯ ЭНЕРГИИ, РЕГУЛИРОВАНИЕ ВЫБРОСОВ CO_2.

AUTHORS:

Alexey Klimenko, Ph.D., docent, Deputy Head of the Research Laboratory of Fuels and the Environment, Deputy Head on Scientific and Technological Development of Road Vehicle Testing Centre of the State Enterprise State Road Transport Research Institute, Full Member of the Transport Academy of Ukraine, e-mail: aklimenko.insat@gmail.com, phone: +38(067)442-29-22, Ukraine, 03113, Kyiv, Peremohy Avenue, 57, orcid.org/0000-0002-2323-6839.

Nikolas Hill, Associate Director, Knowledge Leader - Transport Technology and Fuels at Ricardo Energy & Environment, e-mail: nikolas.hill@ricardo.com, phone: +44(0)1235-75-3522, Gemini Building, Fermi Avenue, Harwell, Didcot, Oxfordshire, United Kingdom, orcid.org/0000-0003-4585-5144.

Elisabeth Windisch, Ph.D., Transport Analyst, OECD, e-mail: elisabeth.windisch@itf-oecd.org, phone: +33-1-73-31-25-66, 2, rue André Pascal, 75775 Paris Cedex 16, France, orcid.org/0000-0003-2791-0912.

АВТОРИ:

Олексій Клименко, кандидат технічних наук, доцент, заступник завідувача Лабораторії дослідження використання палив та екології, заступник керівника Випробувального центру колісних транспортних засобів з науково-технічного розвитку, ДП «ДержавтотрансНДІпроект», дійсний член Транспортної академії України, e-mail: aklimenko.insat@gmail.com, тел.: +38(067)442-29-22, Україна, 03113, Київ, проспект Перемоги, 57, orcid.org/0000-0002-2323-6839.

Ніколас Хілл, заступник директора, лідер знань - Транспортні технології та паливо в компанії Ricardo Energy & Environment, e-mail: nikolas.hill@ricardo.com, тел.: +44(0)1235-75-3522, Будівля Близнюків, проспект Фермі, Харвелл, Дідкот, Оксфордшир, Великобританія, orcid.org/0000-0003-4585-5144.

Елізабет Віндіш, Ph.D., транспортний аналітик, OECD, e-mail: elisabeth.windisch@itf-oecd.org, тел.: +33-1-73-31-25-66, вул. Андре Паскаля, 75775, Париж, Цедекс 16, orcid.org/0000-0003-2791-0912.

АВТОРЫ:

Алексей Клименко, кандидат технических наук, доцент, заместитель заведующего лаборатории исследования использования топлив и экологии, заместитель руководителя Испытательного центра колесных транспортных средств по научно-техническому развитию, ГП «ГосавтотрансНИИпроект», действительный член Транспортной академии Украины, E-mail: aklimenko.insat@gmail.com, Украина, 03113, Киев, проспект Победы, 57, тел.: +38 (067) 442-29-22 , orcid.org/0000-0002-2323-6839.

Николас Хилл, заместитель директора, лидер знаний - Транспортные технологии и топливо в компании Ricardo Energy & Environment, e-mail: nikolas.hill@ricardo.com, тел.: +44(0)1235-75-3522, Здание Близнецов, проспект Ферми, Харвелл, Дидкот, Оксфордшир, Великобритания, orcid.org/0000-0003-4585-5144

Элизабет Виндиш, Ph.D., транспортный аналитик, OECD, E-mail: elisabeth.windisch@itf-oecd.org, тел.: +33-1-73-31-25-66, ул. Андре Паскаля, 75775, Париж, Цедекс 16, Франция, orcid.org/0000-0003-2791-0912.

РЕЦЕНЗЕНТИ:

Сахно В.П., доктор технічних наук, професор, Національний транспортний університет, завідувач кафедри автомобілів, Київ, Україна.

Новікова А.М., доктор економічних наук, заступник директора з наукової роботи ДП «ДержавтотрансНДІпроект», Київ, Україна.

REVIEWERS:

Sakhno V.P., Ph. D, Engineering (Dr.), professor, National Transport University, Head of department of automobiles, Kyiv, Ukraine.

Novikova A.M., Ph. D, Economics (Dr.), Deputy Director for scientific work of the State Enterprise State Road Transport Research Institute, Kyiv, Ukraine.