

REDUCING GREENHOUSE GAS EMISSIONS AND NOISE POLLUTION BY SHARED TRAVEL *

SVETOZAR I. ZURNADZHIEV, DELYAN SARMOV

ABSTRACT: This article discusses the problem of greenhouse gas emissions and noise pollution. Existing solutions for their reduction using shared travel applications are presented. Their capabilities and functionality. The requirements for a software product are determined in accordance with the conditions in the country and the gaps in the existing solutions.

KEYWORDS: shared travel, reduce greenhouse gas emissions, reduce noise pollution

DOI: <https://doi.org/10.46687/ICLK2852>

1 Introduction

Global greenhouse gas emissions are serious threat to the whole humanity. Based on the global emissions from 2010, 76% of these emissions are of carbon dioxide (CO₂), 16% are of methane (CH₄), 6% are of nitrous oxide (N₂O) and the rest are of fluorinated gases (F-gases) (see Figure 1.) [1].

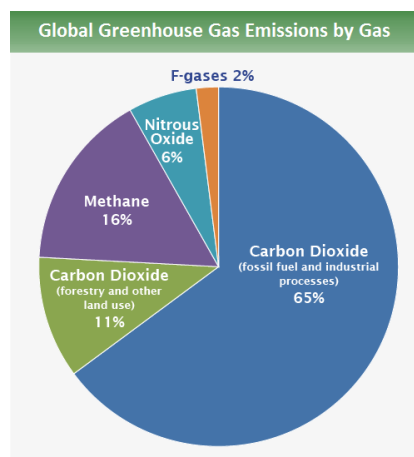


Figure 1. Global greenhouse gas emissions by gas for 2010.

Transportation is one of the economic sectors that produce high gas emissions. Based on the global emissions from 2010, 14% of the global greenhouse gas emissions are result of the transportation economic sector (see Figure 2). The main reason is burning fossil fuels for the different types of transport – road, rail, air and marine. [2]

* Настоящата статия е подкрепена финансово от Проект РД-08-147/02.030.2022.

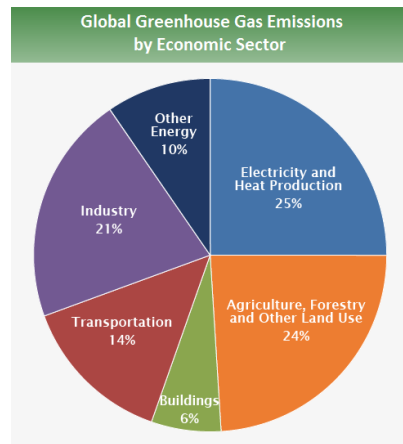


Figure 2. Global greenhouse gas emissions by economic sector for 2010.

Countries do a lot for living in a healthier environment. Reducing the greenhouse gas emissions is an integral part of this plan. In June 2021, the EU adopted a European Climate Law that aims at zero net greenhouse gas emissions by the end of 2050 and at least 55% less by 2030 compared to the levels of 1990[3]. Greenhouse gas emissions per capita in the European Union has decreased significantly overall from 1990 to 2019 [4]. However, two of the EU countries have increased their metric tons of CO₂ per capita equivalent of greenhouse gas emissions – Cyprus from 11 metric tons CO₂ per capita in 1990 to 11.3 metric tons CO₂ per capita in 2019 and Portugal from 6 metric tons CO₂ per capita in 1990 to 6.6 metric tons CO₂ per capita in 2019. Bulgaria in particular decreased their greenhouse gas emissions per capita – from 11.5 metric tons CO₂ per capita in 1990 to 8.1 metric tons CO₂ per capita in 2019. Part of these greenhouse gas emissions are caused by road traffic and in particular by car traffic. Reducing the car traffic reduces the greenhouse gas emissions as well.

Road traffic and in particular car traffic is a big problem for the population nowadays. In addition to the high greenhouse emissions it makes, it causes a lot of noise, which can cause a number of health problems such as sleep disturbance, cardiovascular effects, hearing impairment [5]. About 40% of the population in the countries from EU is exposed to road traffic noise at levels that exceed 55dB, 20% is exposed to levels that exceed 65dB during daytime and more than 30% is exposed to levels that exceed 55dB at night [5]. In 2020 the surveyed points according noise level in Bulgaria are 731. 498 of them are above permissible limits. That is 68.13% of all the surveyed points. The most surveyed points which are above permissible limits of noise are in the big cities of Bulgaria as follows – Sofia, Plovdiv, Burgas, respectively – 51, 34, 26 [6].

2 Body

As travelling is integral part of people's lives, sharing a ride with someone else will make an impact in dealing with the problem with greenhouse gas emissions and noise pollution. Everyone travels, the purpose of the trips can be different – tourism, business, visiting friends and family. One of the options to travel is to buy a personal car, which gives the opportunity to travel with bigger comfort. This approach solves some problems, but quite often it can be an expensive solution. Buying a car is not a cheap purchase, and its use involves a lot of extra costs. However, one of the biggest

problems remains – the traffic and the harmful emissions that are released into the atmosphere. That is why people are stimulated to use the “shared travel” service.

The problem with the high amount of cars and high greenhouse gas emissions is not only in Bulgaria but all over the world. In 2019 according to the data from Eurostat, in Bulgaria there are almost 3 million passenger cars. With approximately 7 million people living in Bulgaria, almost every second Bulgarian owns a car. Only one Member State recorded a decline in the number of registered cars over the period – Bulgaria, with a decline of 10.5% from 2015 to 2019 which is a step in the right direction (see Figure 3). The highest motorization rate (passenger cars per thousand inhabitants) amongst the EU Member States has Luxembourg with 681 passenger cars per thousand inhabitants. Bulgaria has one of the lowest motorization rates in the European union – a bit more than 400 cars per thousand inhabitants. All these statistics can be changed for the better by adopting wider shared travel.

Passenger cars
(number)

	2015	2016	2017	2018	2019
Belgium	5 623 579	5 712 061	5 785 447	5 853 782	5 889 210
Bulgaria	3 162 037	3 143 568	2 770 615	2 773 325	2 829 946
Czechia	5 115 316	5 307 808	5 538 222	5 747 913	5 924 995
Denmark	2 390 823	2 465 538	2 530 047	2 594 469	2 651 726
Germany	45 071 000	45 803 560	46 474 594	47 095 784	47 715 977
Estonia	676 596	703 151	725 944	746 464	794 926
Ireland	2 060 170	2 102 720	2 142 390	2 182 920	2 253 210
Greece	5 107 620	5 160 056	5 235 928	5 282 695	5 406 551
Spain	22 355 549	22 876 830	23 500 401	24 074 151	24 558 126
France	32 326 000	32 076 000	32 005 986	32 034 000	32 416 180
Croatia	1 499 802	1 552 904	1 596 087	1 666 413	1 724 900
Italy	37 351 233	37 876 138		39 018 170	39 545 232
Cyprus	487 692	508 284	526 617	550 695	572 501
Latvia	679 048	664 177	689 536	707 841	727 164
Lithuania	1 244 063	1 298 737	1 356 987	1 430 520	1 498 688
Luxembourg	381 103	390 935	403 282	415 145	426 346
Hungary	3 196 856	3 313 206	3 471 997	3 641 823	3 812 013
Malta	275 380	282 921	291 664	300 140	307 130
Netherlands	8 100 864	8 222 974	8 373 244	8 530 584	8 677 911
Austria	4 748 048	4 821 557	4 898 578	4 978 852	
Poland	20 723 423	21 675 388	22 503 579	23 429 016	24 360 166
Portugal	4 722 963	4 850 229	5 059 472	5 282 970	5 452 119
Romania	5 155 059	5 472 423	5 998 194	6 452 536	6 902 984
Slovenia	1 078 737	1 096 523	1 117 935	1 143 150	1 165 371
Slovakia	2 034 574	2 121 774	2 223 117	2 321 608	2 393 577
Finland	3 234 860	3 322 672	3 398 937	3 470 507	3 549 803
Sweden	4 668 262	4 767 262	4 844 823	4 869 979	4 887 116
Iceland					
Liechtenstein	28 802	29 241	29 675	29 949	30 249
Norway	2 610 000	2 662 910	2 719 396	2 751 949	2 801 208
Switzerland	4 458 000	4 524 000	4 570 800	4 602 700	4 624 000
North Macedonia	383 833	394 934	403 316	415 062	426 045
Turkey	10 589 337	11 317 998	12 035 978	12 398 190	12 503 049
Kosovo (*)			168 759	256 880	309 509

Note: (:) not available.
 (*) This designation is without prejudice to positions on status, and is in line with UNSCR 1244/99 and the ICJ Opinion on the Kosovo Declaration of Independence.
 Source: Eurostat (online data code: road_eqs_carmot)

Figure 3. Passenger cars in European countries from 2015 to 2019.

Technology can help people adopt wider shared travel. From 2005 to 2021, the use of Internet in the world has increased from 1.023 billion in 2007 to 4.901 billion in 2021[7]. That is 379.08% increase for only 17 years. The population of the world as of 2021 is about 7.9 billion people [8]. That means that about 2/3 of the world population uses Internet. Individuals regularly using the Internet in Bulgaria is even higher – 69.2% [9]. It is difficult to imagine life without the technologies people use in their daily lives – smart phones, laptops, tablets, personal computers and other devices. Their main idea is to make people’s lives easier by giving an unlimited number of opportunities. Most often they

are used for easy access to information, fast communication and finding the services needed. One of the many things that technology can make better is travelling.

The ridesharing service itself is that people with a car travelling in a certain direction offer people looking for transport to travel together. The idea itself solves the most serious problems of traffic and harmful emissions mentioned above. The service is usually not free. Some price has to be paid to the driver of the car, but often this price is much lower than the standard price of the transport system. The bonuses people get from the service used are usually: faster, cheaper and more comfortable travel. Also by using this service, people have the opportunity to meet others and make new friends. Often the opportunity to communicate with strangers leads to the feeling that the final destination was reached quite quickly. However, this service hides its risks, but the decision to take these risks is made by anyone who decides to use it.

But are shared trips legal? Some of the biggest ridesharing companies like Uber are illegal in some jurisdictions. For example, Uber is banned in Denmark, Hungary, Thailand, Canada, Germany, Romania, Bulgaria and other countries. Usually the reason is that such online companies do not follow proper transportation protocols and that they offer unfair competition practices due to lack of regulations [10]. In Bulgaria there are strict rules about the shared trips.

In 2020, the Bulgarian Parliament adopted amendments to the Penal Code which are related to the shared trips. According to it in order to classify a shared trip as a crime, the specific act must be distinguished by three elements that must be available at the same time.

- The first of them is to carry out a public transport of passengers. According to the law, such is the case when the transport is performed at someone else's expense or against payment and economic benefit.
- The second element in order to assume that public passenger transport constitutes a crime is if the individual does not have the appropriate authorization to do it.
- The third element is if the activity of public transport of passengers to be carried out by occupation. In order to assume that it is carried out by occupation, it has to be both a systematic activity and the activity should be one of the main sources of income for the one who performs it.

As long as the drivers do not charge their passengers extra money for the travel to get a profit (except paying for the fuel equally between the passengers), they are not violating the law. To summarize, shared travel is legal in Bulgaria as long as it does not have the three elements at the same time mentioned above.

Hence the questions of how and where people can find this service. As mentioned above, the Internet and technologies provide fast and easy communication. The easiest place to find this type of service is on the Internet. And instead of worrying about how people will get to their desired destination, especially when they have to travel at the last minute, they just go online and find someone to share their journey with.

Uber - the largest ridesharing company with a market cap of about 55 billion dollars [11] begun operating in Bulgaria in December 2014. It provoked massive opposition from taxi drivers and state institutions. The Commission for the Protection of Competition announced a ban on Uber's operations,

citing unfair competition. On 6th of October, 2015, Uber stopped operations in Bulgaria. The Federation of Transport Trade Unions in Bulgaria has officially condemned Uber as illegal in Bulgaria because it does not own a license issued by the Automobile Administration Agency. The company and its drivers do not comply with the road transport law and other relevant legislation. Other arguments for banning Uber are the unfair competition to the licensed taxi companies and buses that are obliged to renew licenses and permits. The Federation of Transport Trade Unions in Bulgaria also claims that Uber customers' safety is at risk because the company itself does not require any evidence about the suitability of the drivers or the roadworthiness of their vehicles [12]. According to Gallup International's survey from 2015, 66% of the people want Uber to keep offering their services with new updated rules and regulations. 72% think that Uber is a good alternative to taxi and bus rides. 77% say that banning Uber is not benefitting consumers in Bulgaria [13].

A website that offers similar service to Uber in Bulgaria is <https://www.sednakola.com/>

It has the functionality to offer travelling between cities in Bulgaria and other European countries with starting point and final destination, date. When publishing an ad, the publisher can also choose additional details that the car has. Unfortunately, the website is not that popular and for March 2022, only 4 rides are published [14].

The other alternative that people use is social networks like Facebook. In groups for specific routes, people publish their ads for travelling between the cities with additional details. For example, one of the groups for travelling between the capital Sofia and the sea coast city Varna has more than 31,000 members and more than 340 published ads in the last 30 days [15]. Unfortunately, social media groups are only for one route and searching in them is quite hard, so another alternative is needed.

3 Conclusion

The importance of reducing the greenhouse gas emissions and noise pollution is common knowledge and countries must take measures for that. The evidence is clear: to create a healthier environment, people must reduce the road traffic and in particular the car traffic to minimum. By using ride share, evidently people help tackling the problem of greenhouse gas emissions and all the rest mentioned above. People should focus on the future, not just on their own interests and start using rideshare applications more often.

REFERENCES:

- [1] Weiss, K., (2015). Global greenhouse-gas emissions set to fall in 2015, *Nature*. 10.1038/nature.2015.18965.
- [2] Victor, D., D. Zhou, (2013). Climate change 2014: mitigation of climate change., Intergovernmental panel on climate change 5th assessment report. 34-35, (2013)
- [3] European Commission launches proposals to reach 55% emissions reduction by 2030, United Nations Sustainable Development Solutions Network, <https://www.unsdsn.org/european-commission-launches-proposals-to-reach-55-emissions-reduction-by-2030>
- [4] Gruebler, J., Reiter, O., Franz, S., (2020). "Implication of the EU-Mercosur Association Agreement for Austria A Preliminary Assessment."
- [5] Beckenbauer, T., (2013). Road Traffic Noise, Handbook of Engineering Acoustics.

- [6] Registered noise levels, Republic of Bulgaria – National Statistical Institute, <https://www.nsi.bg/en/content/2573/%D0%BC%D0%B5%D1%82%D0%B0%D0%B4%D0%B0%D0%BD%D0%BD%D0%B8/registered-noise-levels>
- [7] Bradshaw, A. (2001). Internet users worldwide., Educational Technology Research and Development. 49. 112-117.
- [8] Total population, United Nations – Population Division, <https://population.un.org/wpp/DataQuery/>
- [9] Individuals regularly using the Internet, Republic of Bulgaria – National Statistical Institute, <https://www.nsi.bg/en/content/15346/%D0%BC%D0%B5%D1%82%D0%B0%D0%B4%D0%B0%D0%BD%D0%BD%D0%B8/ict-usage-households>
- [10] 10 Countries Where Uber Isn't Available, TheTravel, <https://www.thetravel.com/countries-uber-rides-unavailable/>
- [11] Largest ridesharing companies by market cap, Companiesmarketcap, <https://companiesmarketcap.com/>
- [12] Bulgaria: Supreme Court shuts down smartphone car service Uber, Eurofound – European Foundation for the Improvement of Living and Working Conditions, <https://www.eurofound.europa.eu/publications/article/2016/bulgaria-supreme-court-shuts-down-smartphone-car-service-uber>
- [13] Most Bulgarians support Uber, but under new regulations, Mediapool.bg, <https://www.mediapool.bg/masovo-balgarite-sa-za-yuber-no-pod-novi-regulatsii-news242492.html>
- [14] Platform for shared travel “S edna kola”, <https://www.sednakola.com/>
- [15] Travelers between Varna and Sofia, Facebook group, <https://www.facebook.com/groups/travel.varna.sofia>