



## PROBLEMS OF USING HYDROGEN AS FUEL FOR CAR TRANSPORT

*Mohamed Nor Azhari Azman Sultan Idris Education University Tanjong  
Malim, Perak, Malaysia*

***Djalilov Javlon Khalilovich***  
*docent, Tashkent State Transport University*

***Magdiyev Karimulla Irgashevich***  
*senior lecturer, Tashkent State Transport University*

***Annotatsiya:*** *Avtomobil transportida vodorod yonilg'isi sifatida foydalanish sohasida ko'plab muammolar mavjud bo'lib, ular texnologik, iqtisodiy, ekologik va infratuzilma jihatlaridan o'rganilishi zarur. Vodorod energiyasining avtomobilsozlik sohasida keng qo'llanilishi yangi avlod ekologik toza transport vositalarini yaratish imkonini beradi, ammo shu bilan birga bu sohada hal qilinishi lozim bo'lgan ko'plab qiyinchiliklar ham mavjud.*

***Kalit so'zlar:*** *avtomobil transporti, vodorod yonilg'isi, ekologik toza transport vositalari, gaz, chiqindilar, infratuzilma, iqtisodiy barqarorlik.*

***Аннотация:*** *В области использования водорода в качестве топлива на автомобильном транспорте существует множество проблем, которые необходимо изучать с технологической, экономической, экологической и инфраструктурной точек зрения. Широкое использование водородной энергетики в автомобильной промышленности позволит создать новое поколение экологически чистых транспортных средств, но в то же время существует множество трудностей, которые необходимо решить в этой области.*



**Ключевые слова:** автомобильный транспорт, водородное топливо, экологически чистые транспортные средства, газ, отходы, инфраструктура, экономическая устойчивость.

**Abstract:** *There are many problems in the field of using hydrogen as a fuel in road transport, which need to be studied from technological, economic, environmental and infrastructure aspects. The widespread use of hydrogen energy in the automotive industry will allow the creation of a new generation of environmentally friendly vehicles, but at the same time there are many difficulties that need to be solved in this area.*

**Keywords:** *road transport, hydrogen fuel, environmentally friendly vehicles, gas, waste, infrastructure, economic sustainability.*

## INTRODUCTION

Hydrogen fuel has gained a lot of attention among energy sources in recent years, is considered an environmentally friendly and effective source of energy. Having a low polluting nature compared to conventional fuels, helping to reduce carbon emissions, and its role in ensuring energy security are making it an important part of Future Energy Systems. Especially in the field of road transport, the use of hydrogen fuel is creating new opportunities in order to protect the environment and reduce the carbon footprint. At the same time, there are also technological and economic problems that arise in the processes of production, storage, transportation and use of hydrogen fuel, the solution of which is one of the urgent tasks of the development of modern science and technology.

## MATERIALS AND METHODS

When used as a hydrogen fuel, its storage and transportation is one of the biggest problems. Hydrogen is in a gaseous state and has very small molecules, so high pressure tanks are required to store it. These tanks must be made of special



sturdy materials, as the high pressure storage of hydrogen increases safety requirements. The weight and size of the tanks affect the overall design of the car, which can reduce the efficiency and comfort of the car. In addition, the risk of fire and explosion that can occur during the storage and transport of hydrogen at high pressure is also an important safety issue.[1]

The process of hydrogen production is also a problem. Currently, hydrogen is mainly isolated from natural gas, a process that generates carbon dioxide emissions and harms the environment. Therefore, there is a need to produce hydrogen by environmentally friendly methods, for example, by electrolysis of water. However, the electrolysis process requires a large amount of electricity, which reduces its economic efficiency. Therefore, in order to apply hydrogen fuel on a large scale, it is necessary to develop inexpensive and clean energy sources. The lack of necessary infrastructure for hydrogen cars is also a major problem. The number of hydrogen injection stations and their location are limited, which reduces user accessibility. The construction and maintenance of hydrogen stations will require significant costs. Also, these stations must strictly comply with safety requirements, since due to the high flammability and porosity of hydrogen, it is necessary to strengthen safety measures. The development of infrastructure requires effective cooperation between the public and private sectors.[2]

## RESULTS AND DISCUSSIONS

The cost of hydrogen cars also prevents widespread popularity. The production of such vehicles will require high technologies and special materials, which will increase their cost. In addition, the cost of production, storage and transportation of hydrogen fuel also affects the total cost of the car. Higher prices reduce people's interest in hydrogen cars and slow down their widespread distribution. Technologically, it is necessary to create lightweight, durable and safe storage systems for the effective use of hydrogen fuel in cars. At the same time,



scientific research is continuing to improve the efficiency of engines and fuel elements powered by hydrogen fuel. With current technology, the mileage and power performance of hydrogen cars may be lower compared to cars using conventional gasoline or diesel fuel. This creates additional inconvenience for users. Although the environmental benefits of hydrogen fuel are great, it is necessary to solve the problems that arise in its production and delivery process. For example, the source of electricity used in hydrogen production should be environmentally friendly, otherwise the overall environmental benefit will be reduced. Work is also needed to reduce environmental factors in the production and disposal of hydrogen cars.[3]

To popularize cars powered by hydrogen fuel, it is important to increase public confidence in this technology. People should be fully informed about the safety of hydrogen fuel, its use and its effects. To this end, through the media and educational programs, extensive propaganda work should be carried out on the advantages and problems of hydrogen technology.[4]

## CONCLUSION

In conclusion, although the use of hydrogen as fuel in car transport provides many promising opportunities, there are also problems that need to be solved in this area. The main ones are related to safety, storage and transportation infrastructure, environmental and economic efficiency of the production process, the level of technological development and public trust. To solve these problems, scientific research, the introduction of innovative technologies, public policy and private sector cooperation are necessary. Only in this way can hydrogen fuel-based Road Transport become widely popular in the future and play an important role in protecting the environment and improving energy efficiency.



## REFERENCES

1. Karimov M., (2022). Prospects for the use of hydrogen energy in cars. Tashkent: Publishing House Of The Academy Of Sciences Of Uzbekistan.
2. Tursunov N., (2021). Alternative fuels and their use in transportation. Tashkent: Publishing House" New Generation".
3. Kadyrov S., (2023). Hydrogen fuel cells and automotive energy. Samarkand: Publishing House" Ilm Ziyο".
4. Rasulova L., (2020). Environmental impact of automobile transport and environmental issues. Tashkent: Publishing House" Ecology Of Uzbekistan".
5. Islamov A., (2022). Technologies for applying hydrogen fuel in transport. Tashkent: Publishing House" Technopark".
6. Ergashev D., (2021). Improve fuel efficiency and environmental safety. Namangan: Publishing House" Scientific Field".
7. Abdurahmanov Z., (2023). Physicochemical properties of automotive fuels. Tashkent: Publishing House" Science and Technology".
8. Khojaev F., (2022). Problems of hydrogen fuel and its use in transportation. Bukhara: Publishing House" Innovation".