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Research Article

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The use of Green Nano Hydrogen as Fuel and its Effect

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Abstract

Renewable energy is now considered a more desirable source of fuel compared to nuclear power due to the absence of safety risk and disasters. Considering that the major component of greenhouse gases is carbon dioxide, there is a global concern about reducing carbon emissions to minimize the problem of climate change. In this regard, different policies could be applied to reducing carbon emissions, such as enhancing renewable energy deployment and encouraging technological innovations. Two possible solutions may be implemented to reduce carbon dioxide (CO2) emissions and hence to overcome the problem of climate change: replacing fossil fuels with renewable energy sources as much as possible and enhancing energy efficiency. In this paper, we discuss alternative technologies for enhancing renewable energy deployment and energy use efficiency keeping into consideration of climate conditions in Libya, Green Nano hydrogen is a universal, light and highly reactive fuel, through a chemical process known as electrolysis. This method uses an electric current to separate hydrogen from oxygen in water, If this electricity is obtained from renewable sources, we will produce energy without emitting carbon dioxide into the atmosphere. Hydrogen is the most abundant element in the universe, but on Earth it does not appear pure in nature, and requires energy to separate. The most common method is to extract hydrogen from water, which is made up of two parts hydrogen and one part oxygen (hence H2O). Doing so is fairly simple. You can use heat and chemical reactions to release hydrogen from organic matter such as fossil fuels. However, this is considered very polluting.

Green Nano hydrogen is a universal, light and highly reactive fuel, through a chemical process known as electrolysis. This method uses an electric current to separate hydrogen from oxygen in water, If this electricity is obtained from renewable sources, we will produce energy without emitting carbon dioxide into the atmosphere [1]. Hydrogen is the most abundant element in the universe, but on Earth it does not appear pure in nature, and requires energy to separate. The most common method is to extract hydrogen from water, which is made up of two parts hydrogen and one part oxygen (hence H2O) [2]. Doing so is fairly simple. You can use heat and chemical reactions to release hydrogen from organic matter such as fossil fuels. However, this is considered very polluting [3]. Hydrogen production worldwide is responsible for CO2 emissions equivalent to those of the United Kingdom and Indonesia combined. (Hydrogen is mostly used in the petroleum refining industry and the production of ammonia fertilizers [4] the use, Green Nano hydrogen can be widely used Electric cars and trucks powered by hydrogen fuel cells, Container ships powered by liquid ammonia made of hydrogen, "Green Steel" refineries that burn hydrogen as a heat source instead of coal, Hydrogen electric turbines that can generate electricity at times of peak demand to help stabilize the electricity grid and An alternative to natural gas for cooking and heating in homes. Risks, Like any gas, hydrogen can be compressed and stored in tanks, then used as needed. However, the volume of hydrogen is much larger than that of other hydrocarbons; Almost four times that of natural gas. Storing it requires pressures up to 700 times normal atmospheric pressure or cooling to minus 253 degrees Celsius, which is close to absolute zero. It is estimated that the cost of doing so could add anything from 60 cents to $7 per kilogram, making it less competitive with other fuels. In addition to the cost of storage, there is a problem with the tubes [5].

Advantages and disadvantages, Green Nano hydrogen energy source has its pros and cons, the most important of which are: Advantages , Sustainable: Green Nano hydrogen does not emit polluting gases either during combustion or during production , Storable: Hydrogen is easy to store, allowing it to be used later for other purposes and at other times indirectly after it has been produced [6] , Versatile: Green Nano hydrogen can be converted into electricity or synthetic gas and used for domestic, commercial, industrial or transportation purposes and Transportable It can be blended with natural gas in proportions of up to 20% and use the same gas pipelines and infrastructure, increasing this pro-

portion requires changing the various elements in the existing gas networks to make them compatible. Defects , High cost: Energy from renewable sources, which is essential for generating green Nano hydrogen through electrolysis, is more expensive to generate, making hydrogen more expensive , High energy consumption: Hydrogen production in general and green Nano hydrogen in particular requires more energy than other fuels and Safety issues: Hydrogen is a highly volatile and flammable element and therefore comprehensive safety measures are required to prevent leaks and explosions [7]. Infrastructure, increasing this ratio requires changing the various elements in the existing gas networks to make them compatible [7]. The difference between blue and green Nano hydrogen Blue hydrogen is created from fossil sources, where carbon emissions are captured and stored. While green Nano hydrogen is made from non-fossil sources, it is preferred by policy makers and environmentalists who warn of the continued fossil economy. The future global chemical process industries are aware of this trend and some are already undertaking massive projects to accelerate the energy transition. Hydrogen is used in petroleum refining and the production of ammonia and methanol, and is mainly produced from fossil fuels by steam reforming of natural gas, and the partial oxidation of methane and coal. Natural gas is currently the main source of hydrogen production, accounting for about 75% of the annual global production of hydrogen of about 70 million tons. This represents about 6% of global natural gas use. Coal follows gas, due to its importance in China, and a small share of oil and electricity use is produced, according to a report by the International Energy Agency (IEA). With growing concerns about climate change, the urgent need to reduce carbon dioxide emissions, decreasing costs of renewable electricity and electrolyzer technology, as well as many supportive government policies, the demand for green Nano hydrogen is gaining. Green Nano hydrogen could provide up to 25% of the world's energy needs by 2050 and become a $10 trillion steerable market by 2050. Investment in green Nano hydrogen production is set to exceed $1 billion annually by 2023. It is expected A clear increase in the number of green Nano hydrogen projects compared to blue hydrogen projects in 2021 based on the increased number of hydrogen production projects announced last year [8]. costs Production costs are expected to fall by 40% until 2025, when any technology must be used on an industrial scale to become economically viable. The same applies to electrolyzer technologies. Currently, electrolyzer prices have decreased by 50% compared to five years ago, due to significant advances in electrolyzer technology and manufacturing capacity [8]. exporting countries Saudi Arabia is considered the first in the Arab world and fifth in the world, according to the statistics of the Bloomberg Hydrogen Economy Index for 2019, ranking countries according to this indicator , Australia , Japan , Norway , South Korea , Saudi Arabia (according to Bloomberg Index, it will become the first in the world in 2023) [9] and America , Germany Saudi Arabia According to the NEOM project, the $500 billion (£380 billion) city, complete with flying taxis and robotic home help, is set to become home to one million people [10]. Air Products & Chemicals, the US industrial gas giant, announced in 2020 plans to build a green Nano hydrogen plant in Saudi Arabia with a capacity of 4 gigawatts of wind and solar power, the largest project of its kind in the world announced so far [11], Air Products, ACWA Power Saudi Arabia and NEOM will own the $5 billion plant, and the completed facility will produce 650 tons of green Nano hydrogen per day[12], enough to power about 20,000 hydrogen-powered buses [13]. The fuel will be shipped in the form of ammonia to final markets worldwide and then converted back into hydrogen, and ammonia production is expected to start in 2025 [13].

References

1. Burton, N. A., Padilla, R. V., Rose, A., & Habibullah, H. (2021). Increasing the efficiency of hydrogen production from solar powered water electrolysis. Renewable and Sustainable Energy Reviews, 135, 110255.
2. Korte, C., Mandt, T., & Bergholz, T. (2016). Physics of Hydrogen. Hydrogen Science and Engineering: Materials, Processes, Systems and Technology, 563-600.
3. Pignatello, J. J., Mitch, W. A., & Xu, W. (2017). Activity and reactivity of pyrogenic carbonaceous matter toward organic compounds. Environmental science & technology, 51(16), 8893-8908.
4. Shah, A. N. (2016). A study of Carbon Credit Market in India (Gujarat).
5. Sürer, M. G., & Arat, H. T. (2022). Advancements and current technologies on hydrogen fuel cell applications for marine vehicles. International Journal of Hydrogen Energy, 47(45), 19865-19875.
6. Midilli, A., Ay, M., Dincer, I., & Rosen, M. A. (2005). On hydrogen and hydrogen energy strategies: I: current status and needs. Renewable and sustainable energy reviews, 9(3), 255-271.
7. Vidas, L., & Castro, R. (2021). Recent developments on hydrogen production technologies: state-of-the-art review with a focus on green-electrolysis. Applied Sciences, 11(23), 11363.
8. Mitchell, J. V., Marcel, V., & Mitchell, B. (2012). What next for the oil and gas industry? (p. 128). London: Chatham House.
9. Gielen, D., Saygin, D., Taibi, E., & Birat, J. P. (2020). Renewables-based decarbonization and relocation of iron and steel making: a case study. Journal of Industrial Ecology, 24(5), 1113-1125.
10. Robinson, P. H. (2021). Criminal Law's Core Principles. Wash. U. Jurisprudence Rev., 14, 153.
11. Scita, R., Raimondi, P. P., & Noussan, M. (2020). Green hydrogen: the holy grail of decarbonisation? An analysis of the technical and geopolitical implications of the future hydrogen economy.
12. Scita, R., Raimondi, P. P., & Noussan, M. (2020). Green hydrogen: the holy grail of decarbonisation? An analysis of the technical and geopolitical implications of the future hydrogen economy.
13. Abdelsalam Abuzreda , et al. (2022). "A Review Of Different Renewable Energy Resources And Their Energy Efficiency Technologies" Al-Mukhtar Journal Of Engineering Research (2022) Available at mjer.omu.edu.ly.