A Prospective New Energy Hydrogen: Challenges and Opportunities

Professor Firoz Alam
School of Engineering
RMIT University, Australia
Email: firoz.alam@rmit.edu.au

Abstract

The increasing global population and socio-economic activities have led to a significant surge in energy demand, accompanied by severe environmental pollution and climate change issues such as global warming, frequent extreme weather events, and biodiversity losses. Furthermore, the reserves of fossil fuels are finite and rapidly depleting. Therefore, the finding of alternative zero-emission and/or low-carbon new energy (such as solar, wind, geothermal, and hydrogen energy) has become vital to developing cleaner, more efficient, and sustainable energy solutions. To achieve both the "carbon neutral" goals and worldwide sustainable energy development, the production of green hydrogen is crucial. Green hydrogen can efficiently balance energy supply and demand by converting excess renewable energy into hydrogen for storage and transportation, thereby increasing the overall stability and efficiency of the energy system, especially considering the intermittent and unpredictable nature of solar and wind renewable energy supplies. Thus, the main objectives of this work are to provide an overview of global renewable hydrogen energy development, challenges, opportunities, and a roadmap for a green hydrogen strategy for emerging and developing countries, including Bangladesh.