Research Article

Journal of Chemistry Letters
journal homepage: www.jchemlett.com
ISSN (online): 2717-1892

Future of Hydrogen in Energy Transition and Reform

Nima Norouzi [a,*]

[a] *Department of energy engineering and physics, Amirkabir university of technology (Tehran polytechnic), 424 Hafez Avenue, PO Box 15875-4413, Tehran, Iran*

ARTICLE INFO

Article history:
Received
Received in revised form
Accepted
Available online

Keywords:
Hydrogen Energy
Renewable Energy
Carbon Emission
Energy Storage
Fuel Cell

ABSTRACT

In order to ensure energy supply and cope with climate change, a new round of energy transformation must be carried out. Hydrogen can play an important role in energy transformation with its high energy density and clean and low-carbon energy attributes. First of all, it clarified the development position of hydrogen energy in the transformation of energy. It pointed out that hydrogen energy is an energy carrier that promotes the large-scale development and utilization of renewable energy, and it is an energy medium that realizes the interconnection, complementation, and coordinated optimization of multiple energy networks. Secondly, the technical route for the development of the hydrogen energy industry is analyzed. Combining with the characteristics of China's energy structure and development status, the development of the hydrogen energy industry should focus on the core advantages of clean, low-carbon, flexible and efficient, in the coordinated development of hydrogen and renewable energy, the clean production of industrial hydrogen, and the development of fuel cell technology. In addition, transportation power systems and distributed energy systems can give priority to promoting large-scale development.

1. Introduction

The environmental pollution and climate change brought about by the large-scale development and utilization of fossil energy have exacerbated global concerns about energy issues. Therefore, the energy transition of renewable energy instead of fossil energy is an inevitable trend [1].

With its high energy density and clean and low-carbon energy properties, hydrogen can play an important role in the energy transition and reduce human society's excessive dependence on fossil energy, which is important for achieving the greenhouse gas emission reduction targets the Paris Agreement [2] significance.

Since entering the 21st century, the development and utilization of hydrogen energy have gradually accelerated. Many countries and regions have successively elevated the development of the hydrogen energy industry to the height of the national energy strategy and have continuously increased their support for the development and industrialization of hydrogen energy and fuel cells[3,4,5]. In recent years, countries worldwide have deployed several demonstration projects to promote the large-scale development of the hydrogen energy industry. In July 2019, the German government approved 11 hydrogen energy demonstration projects, including green hydrogen production in megawatt-scale large electrolytic cells, synthetic methane production, and methanol production [6]. In 2016, China listed "Hydrogen Energy and Fuel Cell Technology Innovation" as one of the 15 key tasks of the "Energy Technology Revolution and Innovation Action Plan (2016-2030)"; it will "develop a new generation of energy technologies such as hydrogen energy and fuel cells" "As a disruptive technology that leads industrial change in development, it is included in the "Outline of National Innovation-Driven Development Strategy," marking the inclusion of the hydrogen energy industry in the national energy strategy. In March 2020, the National Development and

* Corresponding author.e-mail: nima1376@aut.ac.ir