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The Israel-based firm Doral has won a NIS 3.3 million grant from the Energy Ministry ...

Hydrogen is the most common element in nature but rarely exists in its pure form in nature. It is possible to produce hydrogen from water through the electrolysis process by using electricity. In addition, it is possible to produce hydrogen from organic materials, such as natural gas and coal, using several methods of reforming and gasification. It is customary to classify hydrogen into several types according to the raw materials and the production process outcomes- brown hydrogen and grey hydrogen are produced from fossil fuels and involve greenhouse emissions. In producing blue hydrogen, a process is added to capture greenhouse gases, while green hydrogen is produced from the start without carbon emissions, using electricity from renewable energy.

Hydrogen is purposeful. The existing technologies already allow the use of hydrogen to produce, store, and use energy in different ways. Hydrogen conveying can be done in pipelines, in liquid form by ships, or through chemical solutions (e.g., ammonia or DME). Hydrogen can be consumed as a means of electricity production or fuel for cars, trucks, ships, and airplanes.

The use of hydrogen can help deal with various critical energy challenges. It offers ways to reduce carbon emissions from various sources, including long-term transport, chemicals, iron and steel production, where it is not easy to achieve significant emissions reductions. The use of hydrogen can help improve air quality, access to energy in insulated and remote locations, the electricity grid’s reliability, and enhance energy security.

Hydrogen actually allows energy storage, and it appears as one of the promising options to ensure the long-term storage of renewable energy for days, weeks, and even months. Therefore, hydrogen allows extensive penetration of renewable energies, mainly solar and wind energies, whose availability is not always synchronized with demand.

However, hydrogen production requires energy investment, and sometimes the process efficiency is inadequate. Furthermore, safety issues should be considered. Hydrogen also requires greater energy for storage and transportation in comparison with fossil fuels. Currently, the desired green hydrogen production costs are higher than hydrogen production using fossil fuels, and a heavy initial investment is required in infrastructure. In light of the forecasts that about 18-20% of the global energy economy in 2050 will be based on hydrogen, huge amounts are already being invested in the hydrogen economy throughout the world.

The main use of hydrogen in the world today is as raw material for the manufacturing of fertilizers and chemicals – 55% of the hydrogen is used in ammonia production, 25% in oil refining, and 10% in methanol production. However, hydrogen as an energy carrier is an important element in the solution options offered to limit global warming. Indeed, in the past two years, various countries throughout the world are

publishing strategies for incorporating hydrogen in their energy economy for transportation, de-carbonization of the industry, building air conditioning, and support for the penetration of regenerating energies, as well as implementing programs to support the incorporation of hydrogen by setting objectives, incentives, or their combination.

Now is the right time to take advantage of hydrogen’s potential in playing a key role in the future of clean, safe, and affordable energy. The International Energy Agency (IEA) published a landmark report to analyze the current state of hydrogen technologies and suggest guidelines for its future development. The report reveals that clean hydrogen is currently enjoying an unprecedented political and business momentum, with a rapidly expanding number of policies and projects worldwide. The report concludes that it is time to increase the technological supply and reduce the costs to allow extensive hydrogen use. The pragmatic recommendations offered to governments and industry will allow us to take advantage of this growing momentum in full.

For the State of Israel to join the global effort to limit global warming and enjoy the economic and environmental benefits, the Forum participants recommended several steps worth taking.

1. A road map to integrate hydrogen in the Israeli energy economy – the subject must be examined critically in accordance with Israel’s unique conditions. The examination of this issue should include consideration of a variety of topics, including the raw materials for production, production technologies (their ripeness and cost-effectiveness), transportation and storage solutions, applications relevant to Israel, and the proportional part of hydrogen in the future fuel mix, by comparing hydrogen with alternative solutions. Based on the examination findings, a strategy will be formulated for the optimal integration of hydrogen in the Israeli energy economy.

2. Developing a dedicated hydrogen regulation – the absence of dedicated regulation and viewing hydrogen through the prism of dangerous material only, constitute a bottleneck for developing and implementing hydrogen technologies in Israel. A suitable regulation is required for all stages: production, transportation, storage, and use, both in transportation (both for gas stations and vehicles) and the field of energy storage.

3. Israel’s place in international hydrogen trade – it is recommended to examine the possibility of transporting hydrogen in our region (through seaports). It is especially recommended to examine Israel’s possible cooperation as a MENA state with European or Middle Eastern countries in projects of green energy production.

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