SPACE POWER SYMPOSIUM (C3)
Space Power Experiments Applications and Benefits (4)

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THE ROLE OF THE JRC-IE IN SUPPORT OF THE UPCOMING HYDROGEN ECONOMY AND ITS POTENTIAL APPLICATIONS FOR SPACE ACTIVITIES

Abstract

Hydrogen will assume a key role in Europe's effort to adopt its energy dependent society to satisfy its needs without releasing vast amounts of Greenhouse Gases (GHG), which are seen as the major cause for the change in the Earth's climate. The paradigm shift is so paramount that one speaks of the "Hydrogen Economy", as the energy in this new and ecological type of economy is to be distributed by Hydrogen. However, H2 is not a primary energy source like nuclear power but rather an energy carrier. As such it is a means of storing, transporting and distributing energy, which has to be generated by other means, like solar, wind or nuclear power plants – such as by the process heat of Gen IV reactors - if one wants to avoid any GHG emissions.

Various H2 storage methods are possible, but as it stands right now the most favoured one in terms of energy density of storage and practicability is the storage of gaseous Hydrogen in high pressure tanks. The biggest promoter of this storage methodology is the automotive industry that is already preparing the generation change from the fossil fuel internal combustion engines to Hydrogen based fuel cells. Yet there are more applications, all adding to the synergy potential with the aerospace sector.

The JRC-IE plays a key role in the European Union's 20-20-20 strategy. The Institute for Energy (IE) is part of the Directorate General Joint Research Centre (JRC) of the European Commission. Its mission is to provide scientific and technical support for the conception, development, implementation and monitoring of community policies related to energy. The JRC-IE's research efforts in solar and nuclear power, power management, as well as hydrogen generation and storage, detection and usage render its activities a contribution of high importance for the policy maker trying to set up the proper energy mix of the future.

This paper presents the activities at the JRC-IE related to the upcoming Hydrogen Economy and the potential synergies with space power systems. In the context of the Hydrogen Economy, the JRC-IE deals with the entire Hydrogen value chain: from the generation to the storage in solid materials and tanks, the H2 sensors to detect any leakages and the final usage in fuel cells. The research on solar cells, nuclear systems and power management systems complements the activities, which provide an important technology input for space related energy issues.