

818 – Hydrogen for Electricity: Technical and Normative Preliminary Analysis

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Abstract: Hydrogen is an energy vector with very high potentiality to be exploited in the next future in many sectors such as automotive, energy production and storage, that could help reaching the CO₂ neutrality before 2050. Even if hydrogen has an elevated energy density per unit of mass, and its use in electrolyser allows to generate only electricity and water without pollutants, it has a very low volume energy density. The hydrogen storage sector is the main topic of this study: an easily movable plug-in system is designed inside a container to use the additionally electricity produced with renewable sources to generate gaseous hydrogen in electrolyser that will be compressed until almost 700 bar, stored in very high-pressure tank, and converted in electricity using a fuel cell stack. The purpose of this Paper is the analysis of the components contained in the system (15kW), with a focus on the electrolyser and fuel cell technologies, and a market analysis of the whole elements necessary in this type of system. Standards related to hydrogen are proposed to better explain what is needed by this technology to spread and ATEX Directive is explained in relation with H₂ use.