Green molecules for a sustainable global energy system

Christopher Hebling
Fraunhofer ISE, Fraunhofer Institute for Solar Energy Systems,
Heidehofstraße 2 | 79110 Freiburg | Germany
E-mail of the corresponding author: christopher.hebling@ise.fraunhofer.de

The global energy system is undergoing a comprehensive transformation process towards ambitious renewable energy and climate policy goals. With the target of being climate neutral by 2045, fossil fuels must be fully substituted by green energy to cover the global energy demand. For this, there are a wide array of decarbonization strategies based on sustainable electrons and molecules. In most economies, about 20% of end energy demand is provided by electricity. Thus, 80% of energy is provided by molecules in gaseous, liquid or solid state form and it is required to produce these molecules in a climate-neutral way and to use the established transport chains. Overall, the respective market implementation requires an adopted market design careful management to efficiently deploy selected technologies and solutions. Hydrogen is therefore best reserved for uses for which there are currently no viable alternatives, i.e. the use of hydrogen for steelmaking is a so-called no-regret option. Policy should focus on creating measures and climate protection plans, developing a hydrogen roadmap for the region, case studies, recommending action plans for regional and national players and supporting networking among regional stakeholders through information exchange platforms.