

Green Hydrogen as a Balancing Option in an Intelligent Power Grid

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Abstract

Green hydrogen provides an opportunity for long-term energy storage in order to balance the difference between supply and demand. The goal of this paper is to investigate the feasibility of a balancing role of green hydrogen in a future intelligent power grid. The paper compares different options to balance an intelligent power grid. These options are described by their value chains - beginning with renewable energy production, through conversion into storage medium till reconversion (Power to X to Power). The energy supply chains are tested in regard of various characteristics for an intelligent power grid. The obtained results confirmed the possibility of integration of green hydrogen into intelligent power grid, although the transportation was identified as a bottleneck in the supply chain. However, the use of green hydrogen as a single balance option is not sufficient. The combination of various balancing options in an intelligent power grid has been proposed.

Keywords: Green hydrogen, intelligent power grid, energy supply chain