Proceedings of the 11th World Congress on Civil, Structural, and Environmental Engineering (CSEE 2026)
Paris, France - April, 2026
DOI: 10.11159/iceptp25.004

Coupling Wind and Solar Power Generation to Hydrogen Energy Storage

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Extended Abstract

There has been a considerable growth in renewable energy installations in the last two decades. In particular wind energy is one technology that is leading the charge and has the potential to radically change how electricity is generated not only in the USA, but globally. With the need to decrease carbon emissions and meet 2050 decarbonization goals, Massachusetts, the USA, and other countries will not be able to rely on natural gas or gasoline as an energy source to achieve net-zero carbon goals. Hydrogen has gained interest within the last several years as a replacement for other fuels because it does not produce carbon emissions when combusted or used in a fuel cell and can be used for energy storage. To produce hydrogen without carbon emissions, renewable energy sources will need to be procured and used to power electrolyzer stacks for green hydrogen production. This presentation will discuss the progress being made in the USA regarding wind energy as well as opportunities and challenges in using renewable energy to generate hydrogen and use it for energy storage. Comparisons will be made to solar energy generation and batteries for energy storage in order to deliver renewable grid power continually and reliably.