

Hydrogen Distribution Infrastructure for an Energy System: Present Status and Perspectives of Technologies

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Abstract

Hydrogen as a clean energy carrier (its use produces no CO₂ emissions) offers effective solutions for a secure energy supply and a clean environment. To make hydrogen readily available, a hydrogen infrastructure allowing for its convenient distribution to end users is essential. The choice of relevant modes of hydrogen transport and distribution from the production plant is therefore critical. Safe, cost-effective, and energy-efficient solutions are needed. Factors such as the degree of hydrogen penetration, the environmental performance of the different pathways, and geographic parameters will influence the infrastructure deployment. Advances in delivery technologies will allow the existence of a transition infrastructure to support the commercial introduction of fuel cell vehicles and hydrogen stations. In this chapter, an overview of the distribution technologies already mastered by gas companies such as pipelines, gaseous trailers, and cryogenic trucks is given, with insights into costs, advantages or disadvantages, and advanced solutions. Further, supporting technologies such as compressors, pumps, and hydrogen quality requirements for fuel cell applications are presented. The large-scale storage to regulate hydrogen consumption and production is discussed. Finally, recent progress in refueling at filling stations is presented.

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