



The Impacts of Hydrogen Storage Market Growth on Houston Hub

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ABSTRACT

Compared with H₂ projects in the Netherlands or other European countries, Houston hydrogen hub is in its early progress which is planned by the Center for Houston's future in 2020. However, Texas Gulf coast has a unique advantage for developing a global hydrogen hub. Since it already exits over 900 mi hydrogen pipelines, about 3.44 MMt hydrogen annual production, over 40 hydrogen production plants and the world's largest hydrogen storage caverns. With the rising demand for transportation fuels and increasing consumption of oil, the hydrogen storage market is growing rapidly. How to integrate these advantages and develop the hydrogen related industries in the Texas Gulf Coast to catch up the growing demand? How to meet the net-zero goal and become a model for renewable energy transition? These issues are on the agenda, especially in the case of power shortages in Texas in February 2021. Therefore, the assessment of the storage capacity and scales of hydrogen energy demand market in this region is also extremely important under the trends of lower carbon emissions and clean energy development.

This research will draw on the framework of the H₂ vision project in the Netherlands, and combine unique resource, production, infrastructure, transportation, storage, consumption, and policy as a full cycle of hydrogen development. Based on the hydrogen demand evaluation, the value chain of hydrogen storage in the Texas will be examined and separated into four segments, transportation including heavy trucking, industries including steel, petrochemical and related industries, electricity generation for back-up, and hydrogen storage system. In this research, the key point is to study the complete value chain of hydrogen storage in Texas, analyze the challenges and opportunities in the hydrogen market for stakeholders by identifying the specific segments of the hydrogen storage economy in this area. Top-down and bottom-up approaches will be used to determine the scale of the hydrogen storage market in Texas. It also provides a potential frame-

work of fasten its hydrogen related industry that other regions can learn from.