

Abstract

Green hydrogen can be the transitional solution required to reduce anthropogenic emissions and enhance energy independency from fossil fuel. To improve green hydrogen adoption, a cluster-based infrastructure, called a hydrogen hub, is devised taking into account the demand-supply interplay coupled with transport ease. In this paper, we have identified sites across states that are conducive for hydrogen hubs. It involves a multicriteria decision-making (MCDM) framework deployed to assign priorities within competing set of criteria. A comprehensive analytical hierarchy process (AHP) is used to rank criteria that are connected to establish a functioning hydrogen hub. These criteria include, but not limited to, proximity to refineries, fertilizer plants, substations, chlor-alkali units, steel manufacturing plants, water availability, access to gas pipelines, railway line access, and finally distance to highways. Our analyses indicate that proximity to refineries and fertilizers scored higher (scores directly proportional to importance) while railway line access scored the least. These prioritised scores are used to spatially locate sites using geographical information system. In a total of thirteen states identified, Gujarat had the largest parcel of most suitable land for setting up hydrogen hub followed by Maharashtra and Andhra Pradesh. For India to set up a functioning hydrogen economy and achieve green hydrogen goals, it is important to identify states that can drive the agenda forward. This paper illustrates a way (amongst many available ways) to identify states based on their strength and capability to fulfil the national goal of 5 million tons of green hydrogen by 2030.