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THE GEOPOLITICS OF GREEN HYDROGEN.

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Overview

To accelerate the global energy transition process towards a low carbon economy, all energy systems and sectors must be actively decarbonised. Within this context, hydrogen produced from renewable sources has attracted considerable attention due its versatility and sustainability as an energy vector. If this hydrogen modality, produced by the electrolysis of fresh water using solar or wind energy, is adopted worldwide on a large scale in the coming decades, the potential for geopolitical conflict could resemble some aspects that we observe in hydrocarbons market. This research seeks analyse the geopolitical implication of a rising green hydrogen economy. We will address country's potentials of renewable energy resources, the availability of fresh water and their infrastructure capacity for hydrogen.

Methods

This has reviewed of the existing literature on the geopolitical issues involved in the green hydrogen economy. Researchers sought to evaluate if the future of this energy vector will be established based on the availability of water resources, renewable energy, productive and technological infrastructure, governance, internal conflicts and development potential of the nations involved.

Results

Studies by indicate that countries such as Canada, Argentina, Australia, Chile, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates, can emerge as potential exporters of the energy vector, when considering the variables internal consumption and the potential of renewable production in the analysis. However, using fossil fuel reserves and dependence, renewable energy sources, governance and conflict as parameters, the main winners in the green hydrogen economy are Iceland, Mauritania, Guyana, Bhutan, New Zealand, Uruguay, Singapore and Argentina.

For some countries that are part of the European Union, Japan and South Korea that would need to import renewable hydrogen, the geopolitical opportunities may change little. On the other hand, Turkey, Spain and Thailand, currently dependent on imports, can meet renewable hydrogen demands domestically and eventually act as regional energy exporters. Spain, and other European states, could assume a greater role in the EU's energy hierarchy due to their endowment of natural resources and importance as transit centers for imports from North Africa. On the other hand, most South American countries, such as Brazil, with broad access to renewable resources and without the necessary infrastructure for the production, transmission and distribution of renewable energy, can direct the productive structure of the energy vector to smaller scales, to meet of their punctual energy demands. We hope that the data obtained in this study can stimulate new research related to the geopolitics of green hydrogen, as well as provide relevant information that can serve as a basis for decision makers and other stakeholders involved with the topic.

Conclusions

Replacing fossil fuels on a global scale with renewable hydrogen can change the global geopolitical scenario, reshaping the degree of influence of nations. This new energy context can leverage the technological development of the energy vector value chain and maintain the availability of renewable resources. Export champion nations can set policies to trigger investments in renewable hydrogen infrastructure, paving the way for dominance in futures markets. Countries rich in renewable resources with scarce water resources will need to decide how much water resources to allocate for renewable hydrogen production and whether it is economically viable to compete with potential exporters. Importing states can define policies to stimulate local markets with a focus on their climate policy goals by establishing blending quotas for gas networks. Already, countries that have ample access to renewable resources and are unable to build the necessary infrastructure for the production, transmission and distribution of renewable energy, can carry out hydrogen production in smaller off-grid sites. While these point solutions may not benefit from economies of scale, they may still be the most effective solution given infrastructural constraints.

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