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Saudi Arabia Green Hydrogen Market Assessment, By Technology [Proton Exchange Membrane Electrolyzer, Alkaline Electrolyzer, Solid Oxide Electrolyzer, Polymer Electrolyte Membrane Electrolyzer], By Renewable Source [Solar, Wind, Hydropower, and Others], By Transportation Channel [Roadways, Waterways, Pipelines], By End-user [Power Generation, Transportation, Chemicals & Petrochemicals, Steel, Food & Beverages, Medical, and Others], and By Region, Opportunities and Forecast, 2016-2030F

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Abstracts

Saudi Arabia will produce 2.9 million tons of green hydrogen by 2030. Energy is essential for economic and societal development, serving industries, transportation, and everyday necessities. Nevertheless, the increasing energy demand gives rise to environmental challenges, as it leads to the emission of greenhouse gases and contributes to climate change.

Saudi Arabia is embracing green hydrogen as a potential answer to its increasing energy demands while addressing environmental concerns. Green hydrogen offers a clean and sustainable alternative for various sectors by harnessing renewable energy sources, including industries and transportation. Its carbon neutrality is crucial in combating greenhouse gas emissions and aligning with global sustainability objectives. Although still in the early stages, the Kingdom has set ambitious hydrogen production targets, aiming to reach 2.9 million tons per year by 2030 and scale up further to 4

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million tons per year by 2035. This commitment reflects Saudi Arabia's dedication to adopting a forward-looking and sustainable energy strategy.

Saudi Arabia is investing significantly in green hydrogen initiatives, bolstering regional clean hydrogen hubs, and advancing its Green Hydrogen market. As the country progresses, Green Hydrogen gains popularity as a preferred choice for clean energy integration, embraced by businesses and individuals to lower carbon emissions and achieve energy self-sufficiency.

Saudi Arabia Commits to Ambitious Emission Targets

Following the Paris Agreement, Saudi Arabia Commits to Aggressive Emission Targets for a Sustainable Future. Saudi Arabia's unwavering commitment to combat climate change is evident through its establishment of stringent emission targets, aiming to curtail global warming within the ambit of the UNFCCC's Paris Agreement. The country's dedicated approach favors limiting temperature rise to 1.5 degrees Celsius, an endeavor that underlines its aspiration for achieving Net Zero emissions by 2060. Recognizing the monumental task, Saudi Arabia is backing its objectives with a substantial investment exceeding USD 180 billion.

Harmonizing with its emission goals, Saudi Arabia is vigorously venturing into sustainable energy realms by channeling resources into Green Hydrogen initiatives. A noteworthy exemplar transpired in May 2023 when NEOM Green Hydrogen Company propelled the world's largest carbon-neutral green hydrogen facility, with an impressive USD 8.4 billion investment. This momentous stride not only augments the reduction of CO2 emissions but also fortifies the trajectory of green hydrogen's ascendancy as a clean and environmentally responsible energy alternative.

Ambitious Hydrogen Strategy to Diversify Global Energy Exports

Saudi Arabia is positioning itself as a significant global supplier of hydrogen, diversifying its export profile from crude oil by leveraging hydrocarbons, carbon capture, and storage. This approach meets the demands of energy-import-dependent economies seeking environmentally conscious hydrogen imports.

Saudi Arabia's petrochemical expertise and supply chain capabilities enable the country to scale up new technologies like CO2 capture and storage for commercial hydrogen production and export. The Kingdom initially focuses on 'blue hydrogen' production, utilizing hydrocarbon resources for carbon capture. At the same time, its abundant solar

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potential presents an opportunity for a new industrial sector focused on green hydrogen production.

'In line with its goals, Saudi Aramco strives for net-zero emissions by 2050, setting a cornerstone in its mission. By 2026, a colossal carbon dioxide storage site near Jubail will bolster Aramco's leadership in blue hydrogen. The transformation of natural gas into hydrogen, coupled with the production of low-carbon blue ammonia, intends to meet global demand for energy, chemicals, and fertilizers.'

Saudi Arabia Shifts Focus to Green Hydrogen Energy Strategy

Saudi Arabia is promoting green hydrogen as a sustainable energy solution to achieve an environmentally friendly future. The government is implementing policy frameworks, incentives, and funding to encourage green hydrogen adoption. This reduces reliance on imported fossil fuels, improves energy security, and contributes to cleaner energy.

In alignment with the objectives of Vision 2030, Saudi Arabia's commitment to a greener future is further reinforced by the Saudi Green Initiative, which seeks to augment the utilization of clean energy sources while safeguarding the environment. The ongoing development of the National Hydrogen Strategy further underscores the Kingdom's determination, targeting an ambitious production goal of 2.9 million tons annually by 2030. This resolute approach is poised to attract significant investments and offer essential backing to green hydrogen initiatives, paving the way for substantial growth in Saudi Arabia's green hydrogen market. Through these concerted endeavors, Saudi Arabia is a trailblazer in the global transition towards a more sustainable and eco-friendly energy landscape.

Green Hydrogen Gains Momentum in Saudi Arabia

As the costs of renewable energy continue to decline, the utilization of Green Hydrogen is gaining significant traction in Saudi Arabia, emerging as a feasible and economically viable solution. Its integration across various sectors not only enhances the overall efficiency of the energy system but also serves as a valuable means of energy storage. The Kingdom's strategic focus on establishing automotive manufacturing facilities and substantial investments in fuel cell research and development are strong catalysts for driving the expansion of the green hydrogen market.

Saudi Arabia is actively venturing into the realm of fuel cell vehicle production. In April 2021, a memorandum of understanding (MoU) was inked between Hyzon Motors (USA)

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and Modern Group, outlining the potential establishment of a truck assembly plant with a capacity of up to 10,000 vehicles. Aramco's innovation center, LAB7, is actively exploring the possibilities of fuel cell technology, showcasing the Kingdom's commitment to innovation. In December 2021, a collaborative effort between Aramco and Gaussin further explored the potential for hydrogen-powered vehicle manufacturing within Saudi Arabia.

Expanding Hydrogen Infrastructure and Technological Advancements

Saudi Arabia strategically enhances its hydrogen infrastructure for the burgeoning green hydrogen market. With a focus on storage, transport and refueling, it leverages petrochemical expertise to seamlessly integrate hydrogen in power and transportation, promoting its use in vital areas like hydrogen-powered urban transit and effective clean energy storage.

As a pioneering force in fuel cell technology, Saudi Arabia aims to share its knowledge with the global community, contributing to the broader adoption of sustainable energy solutions. In September 2020, Saudi Aramco achieved a historic milestone by delivering 40 tons of blue ammonia to Japan, showcasing the viability and scalability of low-emission technologies. Collaborating with Hyundai OilBank Co. in South Korea, Aramco is resolutely moving toward net-zero emissions by 2050 and has plans to establish a significant carbon dioxide storage facility near Jubail by 2026. By entering the fuel cell vehicle manufacturing field and exploring hydrogen-powered vehicle production, Saudi Arabia is furthering its green hydrogen market, fostering a more ecologically sustainable automotive industry, and propelling the nation toward a greener and lower-emission future.

Impact of COVID-19

The energy landscape of Saudi Arabia was significantly impacted by the COVID-19 pandemic, causing disruptions and reduced demand for fuels and industrial operations. This crisis highlighted the importance of resilience and carbon emission reduction. In response, both the Saudi government and private sector have made substantial investments in green hydrogen initiatives, infrastructure, and research.

The post-pandemic era has witnessed a surge in Saudi Arabia’s green hydrogen sector, driven by a growing reliance on renewables like solar and wind for green hydrogen production. Challenges, including logistical constraints, financial barriers, and variable government commitment, have influenced investment dynamics. Despite these

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hurdles, Saudi Arabia remains steadfast in advancing its green hydrogen agenda, aiming for a sustainable energy future.

Impact of Russia-Ukraine War

The Russia-Ukraine conflict has highlighted the vulnerabilities of Saudi Arabia's heavy reliance on fossil fuels, which constitute a significant portion of its economy. Saudi Arabia plans to reduce its oil production to counter Chinese competition and address falling prices. The country is actively exploring alternative energy sources and technologies to enhance energy security and reduce dependence on fossil fuel imports. Investing in cleaner and sustainable energy solutions is a priority to mitigate potential disruptions to energy supplies caused by geopolitical conflicts.

Given Saudi Arabia’s prominence as a leading oil and petrochemical exporter, its well-established oil infrastructure, including ports, storage facilities, and pipelines, can be repurposed for green hydrogen development. This strategic shift aims to bolster Saudi Arabia green hydrogen market and align with its vision of a sustainable energy future.

Key Players Landscape and Outlook

Key stakeholders in the green hydrogen sector of Saudi Arabia are deeply involved in research and development (R&D) activities to advance technologies, minimize production expenses, and improve overall efficiency. These prominent players are making substantial financial commitments towards large-scale initiatives and forming strategic alliances, driving the growth of the green hydrogen market, and facilitating the establishment of green hydrogen infrastructure within Saudi Arabia and internationally.

In July 2023, Engie and Saudi Arabia's Public Investment Fund (PIF) signed a preliminary deal to collaborate on green hydrogen projects in Saudi Arabia. The partnership aims to accelerate the country's energy transition, aligned with the objectives of Vision 2030. The agreement enables both parties to assess the feasibility of co-development opportunities to foster sustainable growth in the kingdom.

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