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Role: Energy Security and Climate Policy Advisor

# The EU's Green Hydrogen Investments: Energy Security and the Green Transition

## Summary

**KEY POINTS**

**1. Energy Security and Fossil Fuel Dependence**

**2. EU Investment and Policy Framework**

**3. Economic and Geopolitical Challenges**

The European Union's investments in green hydrogen are one of the key policy areas for strengthening energy security and reducing dependence on imported fossil fuels. While preparing this policy brief, my research question was: "How can the EU's investments in green hydrogen strengthen energy security and reduce dependence on imported fossil fuels?". My research hypothesis is that investments in green hydrogen could contribute to energy independence and the goal of climate neutrality, but that this contribution may be limited due to high production costs, dependence on imports, and infrastructure deficiencies. The findings indicate that while the EU supports the renewable hydrogen market through its hydrogen strategy, the REPowerEU plan, and the European Hydrogen Bank, achieving the 2030 targets presents significant challenges. For this reason, it is recommended that the EU increase its infrastructure investments, set more realistic targets, strengthen cooperation among member states, and diversify its supply sources. The study has identified EU institutions and energy policy decision-makers in member states as its target audience.



## 1. Energy Security and Fossil Fuel Dependence

The European Union is prioritizing investments in green hydrogen to strengthen energy security and reduce its dependence on imported fossil fuels. The European Commission's 2020 Hydrogen Strategy and 2022 REPower Plan aim to develop renewable hydrogen and increase its use in Europe's energy system. In particular, following Russia's war against Ukraine, diversifying energy supplies and strengthening strategic independence have become priorities for the EU. Diversifying energy supplies and strengthening strategic independence have become far more important for the EU, particularly in the wake of the war Russia launched against Ukraine. When produced using renewable electricity, green hydrogen can help reduce the dependence on fossil fuels in sectors where it is difficult to cut carbon emissions—such as the steel, chemical, and cement industries.

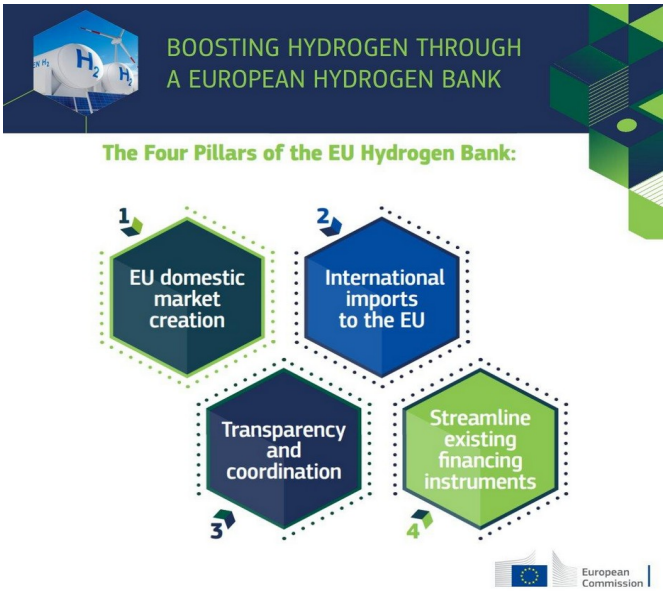
However, green hydrogen's contribution to energy security depends on increasing production capacity and developing the necessary infrastructure. According to the European Court of Auditors' 2024 report, although the EU has taken significant steps to develop the hydrogen market, certain challenges remain. Issues such as production costs, energy losses, and storage and transportation infrastructure are at the forefront. At the same time, it is noted that it will be difficult for the EU to meet its production and import targets for 2030 under current conditions. For this reason, it is not enough for the EU to simply increase its investments in hydrogen; it must also expand its renewable energy capacity, set realistic targets, and diversify its external supply sources.

In addition, investments in green hydrogen are directly linked not only to the EU's energy security goals but also to its goal of achieving climate neutrality by 2050. The European Commission supports the use of renewable hydrogen as a substitute for fossil fuels and the acceleration of the energy transition for the sake of our future. However, to ensure the widespread use of hydrogen, it is necessary to increase the use of renewable electricity in production, boost incentives for private-sector investment, and establish the infrastructure needed to transport the produced hydrogen to industrial zones. Furthermore, while the EU's development of its own production capacity may not completely eliminate hydrogen imports from other countries, it could lead to a more balanced and diversified energy supply structure. For this reason, green hydrogen should be viewed not as a standalone solution for energy independence, but as a long-term strategy that must be considered in conjunction with renewable energy sources and common European energy policies.



## 2) EU Investment and Policy Framework

The EU views the development of renewable hydrogen as a key policy area in terms of the energy transition, the decarbonization of industry, and the strengthening of energy security. In this regard, the European Commission published a document titled "A Hydrogen Strategy for a Climate-Neutral Europe" in 2020 and updated its targets for hydrogen production and imports in 2022 through the REPowerEU plan. These policies aim to increase the use of renewable hydrogen, particularly in certain sectors. Specifically, they aim to increase the use of renewable hydrogen in sectors where it is difficult to reduce dependence on fossil fuels, such as steel, chemicals, and fertilizer production. The EU is utilizing various financing mechanisms to support these goals. According to the European Court of Auditors' 2024 report, funding allocated to hydrogen-related projects for the 2021–2022 period is estimated at approximately 18.8 billion euros. This funding supports production and infrastructure projects through programs such as the Recovery and Resilience Facility and the Innovation Fund.




One of the key instruments within the EU's investment framework is the European Hydrogen Bank. This mechanism aims to reduce the cost disadvantage of renewable hydrogen production and create a more predictable market for investors. In addition, with the update to the Renewable Energy Directive in 2023, targets have been set for the use of renewable hydrogen and other renewable fuels in the industrial and transportation sectors. Thus, the EU aims not only to promote hydrogen production but also to create sustainable demand for hydrogen. However, for these investments to be effective, they depend on further development of the transportation, storage, and distribution infrastructure, in addition to production facilities.

At the same time, the EU's policy and investment framework faces certain implementation challenges. In its 2024 assessment, the European Court of Auditors noted that the EU's 2030 target for renewable hydrogen In its 2024 assessment, the European Court of Auditors stated that it would be difficult to achieve the EU's 2030 targets for renewable hydrogen production and imports under current conditions. According to the report, factors limiting progress include the lack of sufficient analysis in setting the targets, differences in member states' priorities, and the failure to fully assess investment needs. Furthermore, the development of the hydrogen market does not depend solely on public funding. It also depends on private-sector investments and the industry's ability to adapt to new technologies. For this reason, it is of critical importance for the EU to better coordinate its funding sources, align investments with realistic market expectations, and establish a common roadmap among producer countries. Such an approach could enhance the contribution of green hydrogen investments to both climate goals and long-term energy security.

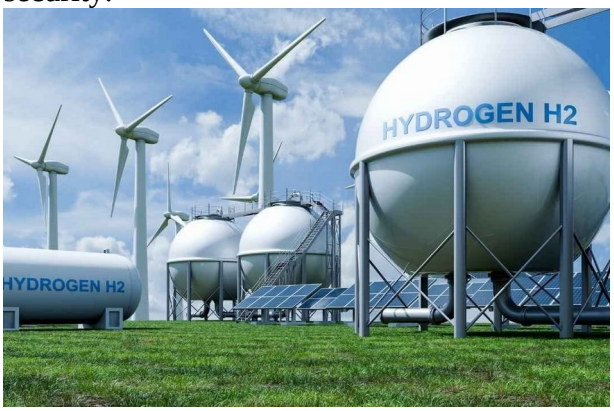
## 3) Economic and Geopolitical Challenges

Although the European Union's investments in green hydrogen have the potential to strengthen energy security, they face various challenges from both geopolitical and economic perspectives. According to a report by the European Court of Auditors (2024), the production costs of renewable hydrogen remain high, and significant investments are required to develop the infrastructure for production, storage, and transportation. In addition, energy losses during the electrolysis process can make green hydrogen more expensive in some cases compared to the direct use of renewable electricity. As a result, this makes it difficult for hydrogen to compete with fossil fuels.

From a geopolitical perspective, there is also a risk that while the EU seeks to reduce its dependence on fossil fuel imports, it may create new supply dependencies. The European Commission points out that certain critical raw materials used in hydrogen production are sourced from a limited number of countries. For this reason, securing hydrogen through imports does not, on its own, guarantee energy independence. It was also noted that achieving the EU's hydrogen production and import targets for the year 1030 would be difficult under current conditions. Differing priorities among member states and the need for private-sector investment are also slowing down the process. For this reason, the EU must also set more realistic goals, diversify its sources of critical raw materials, and develop its own production capacity.

## Key idea to stress out – Optional

In conclusion, it is believed that the European Union's investments in green hydrogen offer significant opportunities for strengthening energy security and achieving the goal of climate neutrality. However, for these investments to succeed, challenges such as high production costs, infrastructure gaps, and dependence on external suppliers must be addressed collectively. In this regard, it is recommended that the EU increase its renewable energy capacity, invest in hydrogen production and transportation infrastructure, encourage private-sector investment, and diversify its supply sources. In addition, stronger coordination among member states should be ensured, and the 2030 targets should be assessed in light of current economic and technological conditions. Thus, green hydrogen can be developed not as a standalone solution that replaces fossil fuels in every sector, but as a complementary tool that supports the energy transition and contributes to long-term energy security.



FOOTNOTES


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FOOTNOTES

9) Balkan Green Energy News. (2024, May 1). *EU to back seven green hydrogen projects with EUR 720 million* [Photograph accompanying article]. https://balkangreenenergynews.com/eu-to-back-seven-green-hydrogen-projects-with-eur-720-million/

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This Policy Brief has been prepared as part of the participants / students' assessment in the framework of the EU Politics lecture.
The content of this policy brief lies entirely with the author. It does not reflect the official opinion of Çağ University.