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Revelations From the EU's Definition of Green Hydrogen

Yoshiaki Shibata
Senior Research Fellow, Manager, New Energy System Group
Assistant Director, Electric Power Industry & New and Renewable Energy Unit
The Institute of Energy Economics, Japan

The EU is currently developing rules for defining hydrogen and hydrogen-based fuels[1] from renewable energy (hereafter collectively referred to as "renewable hydrogen"). The proposition is that renewable hydrogen must meet the requirements for the "additionality" of renewable power generation facilities for use in hydrogen production, as well as meet the requirements for "temporal and geographical correlation" between renewable power generation and water electrolysis hydrogen production, in order to be qualified as a Renewable Fuel of Non-Biological Origin (RFNBO). The Commission made this proposition on February 13,[2] and it will be discussed and either adopted or rejected by the European Parliament and the Council.

The idea behind "additionality" comes from the fact that as it stands, feeding renewable energy sources that are already connected to power grids into water electrolysis requires additional actions, such as new construction or an increase in the operation of fossil-fired power plants. This increases the CO2 coefficient of electricity, which essentially flies in the face of everything we've been working toward. Thus, renewable hydrogen is limited to production solely from newly added renewable energy sources.[3] This renewable hydrogen additionality has already been implemented by a third-party testing and certification body in Germany[4] since 2017.

As for "temporal and geographical correlation", the rules state that renewable hydrogen must be produced from renewable electricity only at times and locations where sufficient renewable electricity is already being generated. Producing hydrogen through water electrolysis during times of low renewable energy generation can lead to an increase in thermal power generation,[5] but operating water

[1] Hydrogen-based fuels, also known as hydrogen derivatives, include e-gas, e-fuel, ammonia, and other hydrogen carriers.
[2] IEEJ Newsletter No.234, March 2023
[3] Since the point in time when a facility is considered a "new" renewable energy facility can vary depending on circumstances, for the sake of convenience, it is assumed that hydrogen production must be generated from electricity from renewable energy facilities installed within three years prior to the start of water electrolysis operations.
[4] TÜV SÜD CMS 70 Standard（12/2017）
[5] Producing hydrogen through water electrolysis technically does lead to increased thermal power generation if

electrolysis during times of surplus energy means any hydrogen produced can be considered as renewable hydrogen, and it can also contribute to grid integration of renewable energy. As for geographic correlation, hydrogen generated via water electrolysis can only be considered renewable if it originates from regions where renewable energy accounts for at least 90% of the electricity generation.[6]

The principles of additionality and temporal and geographical correlations are based on the very rationality that renewable energy ought to prioritize decarbonizing power sources, such as the electricity sector, and only then allocate any remaining renewable energy toward hydrogen production. These rules will also apply to renewable hydrogen to be imported into the EU.

It is unclear whether this definition of renewable hydrogen as set out by the EU will systemically take root around the world, but it may be a catalyst for countries outside of the EU to consider the relationship between renewable energy and hydrogen more strategically as they work toward their own decarbonization goals. This could pose grave implications for Japan's goal of importing hydrogen, as countries that would otherwise consider exporting their hydrogen may instead decide it is more reasonable to pursue their own decarbonization goals by making full use of their domestic renewable energy sources (particularly low-cost alternatives) before they consider exporting any hydrogen produced from renewable energy to other countries. This could mean hydrogen exports become an afterthought which could lead to higher prices. The same is true for blue hydrogen because if potential hydrogen-exporting countries decide to prioritize low-cost CCS resources to further their own decarbonization goals, they will put off using CCS for hydrogen production and the price for blue hydrogen exports will increase.

Both renewable energy and CCS clearly have an enormous potential worldwide, and some countries have been strategically positioning hydrogen as an energy export. However, as the world moves toward decarbonization, there is a high likelihood that potential hydrogen-exporting countries will place stringent controls on the usage of valuable resources like renewable energy and CCS.

It goes without saying that Japan must diversify its hydrogen import options and strengthen its resource

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excess power is not generated, but the rules have been loosened to facilitate the expansion of the water electrolysis market. While it is ideal to assess the synchronicity of renewable energy generation and water electrolysis operation on an hourly basis, a grace period until January 2030 is allowed for monthly-based assessments to provide a certain level of margin.

[6] Producing hydrogen through water electrolysis technically does lead to increased thermal power generation when renewable energy generation ratios are less than 100%, but it is assumed that the relaxed rate of 90% was set to facilitate the expansion of the water electrolysis market.

diplomacy to avoid such risks. It is also a great reminder of how important it is to have a strategy aiming at reducing our dependence on imported hydrogen by strongly promoting the expansion of renewable energy by addressing the issues like the high cost of domestic renewable energy.

Contact : report@tky.ieej.or.jp