

JAPAN

OVERVIEW OF CURRENT REGULATORY REGIME ON HYDROGEN AND FUEL AMMONIA IN JAPAN

☞ Fuel; Hydrogen; Japan; Regulation

Abstract

This article considers the overall regulatory regime over hydrogen and fuel ammonia in Japan. In particular, it discusses the “Basic Strategy of Hydrogen”, published by the “Renewable Energy and Hydrogen Related Ministerial Conference” as part of the government of Japan on 6 June 2023. This new “Basic Strategy of Hydrogen” reviews the Japanese Government’s previous hydrogen policies and technological progress, as well as the challenges and direction of response towards achievement of carbon neutrality aimed in 2050.

Introduction

On 6 June 2023, the “Basic Strategy of Hydrogen” was published by the “Renewable Energy and Hydrogen Related Ministerial Conference” as part of the government of Japan. This new strategy plan was formulated as part of the review over the older version “Basic Strategy of Hydrogen” which was formulated as of 26 December 2017. At the extraordinary session of the Parliament of Japan in October 2020, the then Prime Minister declared “carbon neutrality” by 2050. Since then, the Japanese Government has been actively working towards carbon neutrality. Hydrogen energy is a clean energy that does not emit CO₂ at its burning phase, and it is expected to contribute to the carbon neutrality of Japan’s society taken as a whole. Accordingly, hydrogen and fuel ammonia are considered as important energy sources for Japan in the near future. This new “Basic Strategy of Hydrogen” as of 6 June 2023 reviews the Japanese Government’s previous hydrogen policies and technological progress, as well as the challenges and direction of response towards achievement of carbon neutrality aimed in 2050.

When it comes to the regulatory aspects applicable to hydrogen and fuel ammonia in this new “Basic Strategy of Hydrogen”, there is a description which refers to the overall direction to be pursued by the Japanese Government towards a “hydrogen society” as follows:

“In Japan, there are already certain infrastructures to promote the use of hydrogen, by use of the existing industrial security framework. However, these infrastructures are not necessarily designed for use of hydrogen on larger scales. Therefore, it is required to further develop the environment to encourage the use of hydrogen on such larger scales, including streamlining and optimizing the relevant regulations now effective. To that end, the government and private sectors will have to closely work together to achieve the sufficient collection of the scientific data which would demonstrate the safety of hydrogen with a view to its commercialization as a marketable energy resource. Also, it is necessary to formulate an infrastructure suitable for economical and reasonable use of hydrogen. In particular, it is important to achieve harmonious rule-making from the worldwide perspectives, by announcing and delivering the Japanese technical standards towards the international markets.”

The above statement in the new “Basic Strategy of Hydrogen” has followed through the relevant declaration provided in the most recent version of the Basic Energy Plan of Japanese Government (sixth version) cited as follows:

“With regard to deregulation over hydrogen energy, we have diligently promoted deregulation with the view to introducing FCVs and hydrogen stations into the Japanese society. However, we will continue to steadily promote due integration of the regulations applicable to FCVs for the

purpose of more efficient use of FCVs. In particular, we need to broaden the scope of reforming regulations to catch up with the progress in the social implementation of hydrogen energy in various sectors, typically transportation sector. Further, it is necessary to formulate streamlining regulations based on the ensured safety in the end. Similarly, we must make efforts towards formulation of the relevant international standards which have been developed in parallel with the practical implementation of hydrogen-related technologies such as the equipments for FCVs and hydrogen stations. In this respect, it is notable that the technological developments such as the international hydrogen supply-chain and the development of hydrogen filling technology for commercial vehicles are in significant progress. Accordingly, we should strengthen such formulation of the international standards with a view to securing Japan's technological superiority and promotion of penetration into the overseas markets."

Ahead of the formulation of the new "Basic Strategy of Hydrogen" above, on 5 August 2022, a study group on the development of hydrogen safety strategy was already formulated inside the Ministry of Economy, Trade and Industry (METI). On 13 March 2023, a report of this study group was published reflecting its results. This report sets out a roadmap to rationalise and optimise the rules for the phased implementation of a hydrogen society. In this context, the report of the study group suggests that a system to allow a quick response by the competent authority be devised while maintaining the current framework of the applicable regulations. When it comes to the commercialisation phase of hydrogen energy, permanent measures such as formulating new standardised technical standards should be carried out in order to ensure the safety from all the practical aspects, and a seamless safety environment should be formulated among the different regulations, according to the report of the study group mentioned above.

Regulatory framework as applicable to hydrogen and fuel ammonia

Currently, there is no comprehensive regulatory legislation on hydrogen and fuel ammonia, and they are subject to regulations under different pieces of legislation depending on the applicable situations. Instead, the following regulations currently effective, among others, are applicable to treatment of hydrogen and fuel ammonia, on case-by-case basis:

- (a) *The Fire Service Act* is applicable to those who store or handle 200kg or more of ammonia. Also, simultaneous loading and transportation of high pressure gas and a hazardous material in a vehicle is prohibited under this Act. A safety distance must be secured between a storage facility of handling high pressure gas and a facility of hazardous materials, too.
- (b) *The Building Standards Act* is applicable to the production and storage of compressed gas or liquefied gas.
- (c) *The Act on the Prevention of Disaster in Petroleum Industrial Complexes and Other Petroleum Facilities* is applicable to a newly established place of business in a petroleum industrial complex.
- (d) *The Poisonous and Deleterious Substances Control Act* is applicable to ammonia which is categorised as "deleterious substance" thereunder, and handling of it requires a registration thereunder.
- (e) *The Road Act* is applicable to any traffic of vehicles loaded with hazardous materials of an explosive or highly combustible nature in underwater tunnels.

- (f) *The Ship Safety Act* is applicable to the transportation and storage of hazardous materials such as high pressure gas on a vessel.
- (g) *The Port Regulations Act* is applicable, if a vessel loaded with explosives or other hazardous materials including high pressure gas is going to enter into a specified port.
- (h) *The Civil Aeronautics Act* provides that an aircraft must not be loaded with any items having explosive or highly combustible nature including high pressure gas.
- (i) *The Industrial Safety and Health Act* is applicable to an employer so that dangers arising from substances of an explosive nature will be prevented, where hydrogen and ammonia are regarded as combustible gas falling on the definition of “hazardous materials”.
- (j) *The Mariners Act* is applicable to the loading on a vessel of hydrogen and fuel ammonia as hazardous material.
- (k) *The Air Pollution Control Act* is applicable to a reforming equipment for hydrogen production and for fuel cells.
- (l) *The Noise Regulation Act* and *Vibration Regulation Act* is applicable if an air compressor with a rated motor power of 7.5 kW or more is installed.
- (m) *The Gas Business Act* is applicable to installing a gas pipeline of length of more than 500 metres outside the premises.

Regulations under the High-Pressure Gas Safety Act

Apart from the possible regulations introduced in above, the High-Pressure Gas Safety Act currently appears to be the most frequently applied in many situations, given that this Act generally applies to the transportation and storage of hydrogen in the form of high pressure gas for use in fuel cell vehicles (FCVs). The following provides an overview of the regulations under the High-Pressure Gas Safety Act.

In the beginning, the purpose of the High-pressure Gas Safety Act is to regulate the production, storage, sale, transportation and other aspects related to the handling of high pressure gas, and its consumption, as well as the manufacture and handling of containers. The purpose of the High-pressure Gas Safety Act is also to encourage private business operators and the High-Pressure Gas Safety Institute of Japan to take voluntary measures to ensure public safety by preventing accidents caused by high pressure gas.

Because hydrogen and fuel ammonia are typically handled in the form of compressed gas or liquefied gas, they fall within the definition of “high pressure gas” under the High-Pressure Gas Safety Act. However, this Act does not apply in some cases, for example, high pressure gas situated on shipping vessels is fully regulated by the Ship Safety Act, and thus the High-Pressure Gas Safety Act is not applicable to such high pressure gas situated on shipping vessels.

Production and storage of hydrogen and fuel ammonia

For the purpose of production of hydrogen and fuel ammonia, the permission of or notification to the prefectural governor is required depending on their processing capacities. All of the following acts fall under the “production of high pressure gas”:

- (i) to make non-high pressure gas into high pressure gas;
- (ii) to further increase the pressure of high pressure gas;
- (iii) to make high pressure gas into lower-pressured high pressure gas;
- (iv) to make gas into liquefied gas which is high pressure gas;

- (v) to make liquefied gas into high pressure gas by gasification; and
- (vi) to fill a container with high pressure gas.

Regarding storage of hydrogen and fuel ammonia, the permission of or notification to the prefectural governor is required depending on the storage capacity.

Sale of hydrogen and fuel ammonia

As for the sale of hydrogen and fuel ammonia, a notification to the prefectural governor is required, except for certain type of deregulated cases. The sellers of hydrogen and fuel ammonia are required to appoint a sales chief for each sales location, and are required to conduct sales of the same in accordance with certain technical standards. In addition, the sellers of hydrogen and fuel ammonia are responsible for informing purchasers of certain required matters with respect to the prevention of the occurrence of accidents that may be caused by high pressure gas upon sale.

Import and transportation of hydrogen and fuel ammonia

As for the import of hydrogen and fuel ammonia that are produced overseas, the high pressure gases and their containers must be subject to an import inspection by the prefectural governor to verify conformance with certain technical standards unless:

- (i) the imported high pressure gas and its container have been subject to an import inspection carried out by the High-Pressure Gas Safety Institute of Japan, and have been verified to conform with the above-mentioned technical standards for import, and furthermore, notification is given to the prefectural governor;
- (ii) high pressure gas is imported by unloading from a vessel through a pipeline;
- (iii) high pressure gas in certain shock-absorbers is imported; or
- (iv) there is no risk of interfering with the maintenance of public safety or the prevention of occurrence of accidents.

Certain necessary security measures as specified in the Order of METI (the Order) must be taken in respect of containers containing hydrogen and fuel ammonia that are being transported. In addition, when transporting hydrogen and fuel ammonia: (i) in a vehicle, the technical standards specified in the Order regarding the methods of loading and transportation must be met; and (ii) by a pipeline, the pipeline must be installed and maintained in accordance with the technical standards as specified in the Order.

Consumption of hydrogen and fuel ammonia

As for the consumption of compressed hydrogen of 300m³ or more or liquefied ammonia of 3,000kg or more, the consumer (the Specified Consumer) is required to give notification to the prefectural governor together with the documents describing the type of specific high pressure gas to be consumed, the location, configuration and equipment of the facility for consumption, and the method of consumption for each place of business. In addition, the Specified Consumer must maintain the facility for consumption so that the location, configuration and equipment thereof are in accordance with the technical standards.

Expected deregulation for hydrogen stations and FCVs

This section discusses the recent and upcoming relaxation of regulations related to hydrogen, and in particular with regard to hydrogen filling stations and FCVs. As the act of filling FCVs with hydrogen gas, constitutes

“production” under the High-Pressure Gas Safety Act, it must be carried out by a business operator who has obtained permission or has given notification of production under the High-Pressure Gas Safety Act (an Approved Operator). Therefore, unlike gas stations, it is essential that FCVs are filled at hydrogen filling stations only by workers hired by an Approved Operator, and not the drivers of or other persons using the FCVs. Due to the popularity of hydrogen filling stations, there were many requests from the public for the regulations to be relaxed to allow the installation of self-service hydrogen filling stations. In response to the requests, the relevant regulations were amended in August 2020, so that an Approved Operator may install self-service hydrogen filling stations where customers fill the FCVs with hydrogen by themselves, if the following measures are being taken:

- (i) measures to remotely monitor the operational status of the production equipment at monitoring stations equipped with the necessary monitoring facility;
- (ii) measures to enable self-service filling by customers in a safe manner; and
- (iii) measures such as establishing a system to respond promptly and accurately to emergency measures to prevent the occurrence of accidents, even if employees are not supposed to be stationed on site.

FCVs are subject to the Road Transport Vehicle Act, and containers used to fill hydrogen are also subject to the High-Pressure Gas Safety Act. To further popularise FCVs, measures to streamline the existing system to reduce the burden on Approved Operators and users while also ensuring safety were discussed at the ordinary Parliament session in 2022. In addition, for the purpose of integration of the relevant regulations of the Road Transport Vehicle Act and the High-Pressure Gas Safety Act altogether, an amendment to the laws has been proposed to exclude high pressure gas subject to the Road Transport Vehicle Act from the subject of the High-Pressure Gas Safety Act. Upon the effect of this amendment to the laws, the safety regulations on FCVs shall be integrated into the Road Transport Vehicle Act.

Conclusion

Having looked at the overall regulatory regime over hydrogen and fuel ammonia as above, the regulatory framework in Japan for those issues is not yet greatly developed and is under discussion by and between both the government and private sectors. Movements towards formulation of a new legislation to duly regulate each phase of production, transportation and utilisation of hydrogen and fuel ammonia should be watched out for in the future.

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