International Law Office

ENERGY & NATURAL RESOURCES - JAPAN

Recent regulatory developments in hydrogen energy use

28 June 2021 | Contributed by Nishimura & Asahi

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Introduction

In his 26 October 2020 policy speech, Prime Minister Yoshihide Suga announced that Japan will aim for carbon neutrality and substantially zero CO_2 emissions by 2050. Thereafter, domestic discussions regarding promoting the use of hydrogen energy intensified.

An example of this is the Green Growth Strategy Aiming for Carbon Neutrality by 2050, as formulated by the Ministry of Economy, Trade and Industry (METI) on 25 December 2020, which notes that "Hydrogen is a key carbon neutral technology expected to be utilized in a wide range of fields such as power generation, transportation and industry". In addition, the policy states that Japan is "aiming for a maximum of 3 million tons of hydrogen to be introduced by 2030" and "aiming for a supply of 20 million tons by 2050".

The plan also proposes the use of hydrogen and ammonia to cover approximately 10% of the power supply by 2050.

The Interim Report on Future Hydrogen Policy Issues and Directions for Responses (draft), which was prepared by METI for the Hydrogen and Fuel Cell Strategy Council discussion held on 22 March 2021, also shows the overall direction of Japan's hydrogen strategy to achieve carbon neutrality by 2050 and the hydrogen industry's growth strategy process chart.

In addition, the New Energy and Industrial Technology Development Organisation (NEDO), which is a Japanese governmental research institute, announced on 18 May 2021 that it would provide financial support of up to Y300 billion for projects which establish large-scale hydrogen supply chains (mainly hydrogen transport technologies and hydrogen power generation technologies) and up to Y70 billion for projects which produce hydrogen by water electrolysis. In both instances, the projects will be selected through bid processes.

In discussions regarding the upcoming sixth basic energy plan, which is currently under consideration by the government, the promotion of hydrogen use as well as the expansion of renewable energy use are considered important issues.

The fully fledged use of hydrogen requires the development of various infrastructures, such as:

- terminals to receive, store and conduct the regasification of imported hydrogen;
- hydrogen production plants; and
- facilities to transport hydrogen in liquid, gas or organic hydride form.

Accordingly, greater participation and investment by private companies is expected. On the other hand, the current legal system does not contemplate the use of hydrogen and, as such, it is necessary to clarify the applicable laws and regulations surrounding the streamlined use of hydrogen envisioned in the various policies outlined above.

Therefore, this article outlines the trends relating to the revisions of said legal framework.

Primary laws applicable to hydrogen infrastructures and businesses

Under the current legal system, the Gas Business Act and the High Pressure Gas Safety Law must be considered as the primary laws applicable to hydrogen infrastructures and businesses.

Gas Business Act

The Gas Business Act applies when hydrogen is supplied through pipelines. For instance, METI assessed the safety of the hydrogen pipelines in the Tokyo Metropolitan Athlete Village for the Tokyo 2020 Olympic and Paralympic Games based on the application of the Gas Business Act.

Under the Gas Business Act, the business of supplying hydrogen to consumers through pipelines requires registration with METI as a gas retail business operator. In addition, regulations to protect consumers (eg, suppliers' obligation to explain the key terms and conditions in writing before entering into a supply agreement, to properly respond to claims from consumers and to provide consumers with safety information) will also be imposed on hydrogen retail suppliers.

According to a literal interpretation of the Gas Business Act, businesses operating a hydrogen terminal (which receives, stores and undertakes the regasification of imported hydrogen) must register with METI as a gas manufacturing business, given that liquified natural gas (LNG) terminals must fulfil said registration with METI. However, it is unclear whether hydrogen terminals should be subject to the same regulations as LNG terminals, such as the third-party access regime (under which terminal operators must provide services based on the use of terminals to a third party on fair conditions as long as there is surplus capacity). Such regulatory matters should be discussed, considering the differences between LNG and hydrogen businesses, and the necessity to facilitate new developments in and the construction of hydrogen terminals.

Operators of pipelines used solely for hydrogen supply will not be required to be licensed as a general gas pipeline service business operator or a specified gas pipeline service business operator under the Gas Business Act. This is because such business licences are required only when the pipelines are used to supply gas mainly composed of methane. Regardless of whether a licence under the Gas Business Act is required, the safety requirements under the act will apply to the facilities for hydrogen supply through pipelines. Such safety requirements include:

- the conformity of the gas facility with the relevant technical standards;
- the appointment of a chief gas engineer;
- prudent performance of duties; and
- a requirement to notify METI of construction plans.

High Pressure Gas Safety Act

The High Pressure Gas Safety Act will be the primary regulatory regime applicable to the supply of hydrogen not using pipelines (eg, those using tank lorries). In this case, operators must comply with the safety requirements under the High Pressure Gas Safety Act and must also obtain a manufacturing licence from or submit a sales business notification to the prefectural governor, depending on the type of the business that they will pursue.

METI, through its working groups and council, is currently discussing the integration and harmonisation of laws and regulations applicable to the hydrogen business in conjunction with the review of the overall industrial safety regulations. It will be worth following such discussions by METI.

Use of hydrogen in power generation and electricity sectors

The increased use of hydrogen is also expected in the power generation and electricity sectors. According to the Green Growth Strategy Aiming for Carbon Neutrality by 2050 presented in December 2020, METI has provided a numerical proposal outlining coverage of approximately 10% of the power supply from hydrogen and ammonia by 2050. In order to promote this plan, a mechanism that properly evaluates the value of non-fossil fuels for electricity generated from hydrogen-based power generation must be introduced.

In this regard, the Law on the Advancement of Energy Supply Structures (Supply Advancement Act) requires electricity retailers with annual electricity sales of 500 million kWh or more to increase the non-fossil power source ratio of their electricity supply to 44% or more by fiscal year 2030. However, the treatment of hydrogen (ie, whether it is considered a non-fossil energy source) is not necessarily clear under the Supply Advancement Act. Therefore, the inclusion of hydrogen in the non-fossil energy sources and the treatment of non-fossil value certificates therein must be clarified to encourage retailers to procure hydrogen-based electricity.

From the perspective of promoting the production of hydrogen using renewable energy, such as solar and wind power, the capability to earn an income additional to the energy produced from hydrogen is considered an effective motivator. Specifically, in designing a balancing market (delta kW market), it is important to create a mechanism to evaluate hydrogen production using surplus electricity as an upward demand response and allow

additional income to be earned through such a market.

In addition, in relation to the Law on Rational Use of Energy, which regulates the generation efficiency of certain thermal power plants, hydrogen and ammonia will be excluded from the fuels used in the calculation of generation efficiency (which is determined by the ratio of power output per volume of fuels used for generation). After this amendment, the use of hydrogen and ammonia in thermal power plants will lead to an increase in generation efficiency under said law.

The safety regulations governing the use of hydrogen in power generation businesses will be examined in respect of the issue of whether the regulations based on the current Electricity Business Act are sufficient and appropriate.

Deregulation of hydrogen station trends

Below are some of the regulatory changes relating to the development of hydrogen stations (to supply hydrogen to cars).

Review of regulations on safety supervisors at hydrogen stations
At hydrogen stations, a person with a supervisor's licence for high-pressure gas production and with a certain level of experience must be appointed responsible for supervising the safe production of high-pressure hydrogen as per METI's internal regulations. In November 2020 such internal regulations were revised to deregulate the requirement for the appointment of such a safety supervisor. After the revision, one specific supervisor can supervise the safety of multiple hydrogen stations at the same time, provided that certain conditions are met.

Allowing operation of hydrogen stations by remote monitoring
Considering that overseas, the operation of hydrogen stations for drivers to self-fill hydrogen is already centrally monitored by remote monitoring systems, in August 2020 the relevant regulations were revised to enable the operation of hydrogen stations by remote monitoring.

Additional deregulations

With regard to fuel cell vehicles, METI, through its working groups and council, is discussing measures to reduce the burden associated with the dual application of the Road Transportation Vehicles Act and the High Pressure Gas Safety Act. An extension of the period for high-pressure hydrogen container filling to be used in fuel cell vehicles will also be discussed. In addition, the upper limit of normal pressure (currently 82 megapascals) is being reviewed for a potential increase in the accumulator pressure that may be used at hydrogen stations.

In addition, in discussions concerning the Law on Rational Use of Energy, it is being considered whether to exclude hydrogen and ammonia from the calculation of fuels to be described in the periodic reports by energy users of a certain scale, in order to properly evaluate the use of non-fossil energy, such as hydrogen and ammonia, in terms of energy conservation.

Comment

The promotion of hydrogen use is expected to become an important part of achieving a carbon neutral society. In order to promote the development of various infrastructures necessary as preconditions for such a change, clarification and rationalisation of the relevant laws and regulations will be important, in addition to technological innovation. It will be interesting to continue to follow these developments.

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