

# Empirical study on the legal protection of hydrogen technology industry in Gansu Province

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**Abstract:** Energy is the foundation of national economic development and social stability, which is related to national security and even global climate security. Along with the proposal of the double carbon goal, our country in response to climate change global governance has deeply promoted the new revolution of the energy industry, has carried out a large number of new energy basic development and project construction in Gansu province, as the renewable energy with great potential, hydrogen energy has been much attention. From the perspective of comparative law, this paper explores three dimensions of the development of hydrogen energy science and technology industry in Gansu, namely, the different safety standards, the lack of legal regulation means and the imperfect legal guarantee system, and then puts forward some perfect suggestions on the construction of regional legal policy system, the establishment of safety standard guidelines and the expansion of the scope of energy legal personnel training.

**Key words:** carbon neutrality, carbon peaking; Hydrogen technology; New energy justice; Legal regulation

Introduction: In the “post-Paris era”, China undertakes the grand mission of promoting the building of a community with a shared future for mankind, shouldering the great responsibility of “common but differentiated responsibilities, equity and the principle of respective capabilities”. China must change the role of an active participant to that of an active leader. The development and application of hydrogen technology can not only meet the human demand for energy, but also reduce the dependence on traditional energy, reduce environmental pollution, and promote sustainable development. However, the development of hydrogen energy science and technology is also facing many challenges. In the development process of the hydrogen technology industry, the improvement and implementation of laws and regulations are crucial to ensure the healthy development of the industry and the normal operation of the market, and the lack of legal protection may lead to market disorder, limited technological innovation, and even lead to safety accidents and environmental disasters.

In order to further study the empirical situation of the legal protection of hydrogen energy technology industry, this paper aims to analyze and evaluate the effectiveness and implementation of the current legal system in the hydrogen energy technology industry. Through the research on the legal protection of hydrogen science and technology industry, it provides valuable reference for relevant government departments and decision makers, and provides theoretical support for the healthy development of hydrogen industry and the promotion of clean energy transformation.

## I. Necessity of legal regulation for the development of hydrogen energy industry

“Law is the end of governance”. At present, China’s hydrogen technology industry safety legal protection regulation is in the preliminary stage, its laws and regulations formulation principles, goal orientation, value theory and system framework have not been concluded. According to the relevant legislative demands of the “Energy Law”, the necessity of legal regulation of the hydrogen technology industry is reflected in the following aspects:

### 1. Build a solid national security defense line

“National security is an important cornerstone for the stability of the country and an important guarantee for the survival and development of the country.” Hydrogen energy, as a clean energy source, plays an important role in building a strong national security line. First of all, the production and utilization of hydrogen energy does not produce greenhouse gases, reducing the dependence on fossil fuels and reducing the risk of energy imports. Secondly, hydrogen energy can be produced through a variety of ways, such as hydropower, solar energy, etc., to reduce the dependence on limited resources and improve the stability of energy supply. In addition, the storage and transportation technology of hydrogen energy continues to develop, which can realize long-distance energy transmission, reduce dependence on transportation channels, and improve national energy security. Building a “net-zero emission” sustainable hydrogen energy system with legislation-led approach and law-enforcement thinking has become an important way to achieve decarbonization requirements in addition to renewable resources, and will help accelerate the completion of China’s dual-carbon goal.

### 2. Ensuring high-quality energy development in China

In the process of energy transition, the development and utilization of new energy is basically manifested in the following three forms: primary energy development, energy conversion, and energy terminal use. Primary energy development refers to the development of all energy sources other than conventional energy; Energy conversion refers to the process of transforming energy into a variety of supply-side energy sources through a variety of equipment and technologies in the development of new energy sources; The terminal use of energy refers to the content related to transportation, heating and cooling and other aspects of production and life. In the hydrogen energy industry, hydrogen energy is combined with traditional energy to reduce the dependence on traditional energy and reduce the risk of energy supply. At the same time, hydrogen energy can be converted into electricity through fuel cells and other ways to achieve efficient energy utilization. As an important part of national security, China does not yet have a complete system of laws to systematically regulate and supervise the whole process of energy development, conversion and use. Since 2010, China has been the world’s largest hydrogen energy production country,

China's hydrogen energy has entered a stage of rapid growth, and the Energy Law and relevant laws and regulations have not formulated operable regulations for the development of hydrogen technology industry, and local policies are not uniform. In terms of legislation, the overall planning of hydrogen energy at the national level needs to be solved.

## **II. Empirical research on the rule of law construction of hydrogen energy industry development in Gansu region**

### **1. Relevant laws and regulations**

China's relevant laws and policies were introduced late. The "Strategic Action for Energy Development (2014-2020)" released in 2014 for the first time positioned the strategic direction of energy science and technology innovation to "hydrogen energy and fuel cells". During the 14th Five-Year Plan period, China began to focus on shaping the modern energy system and introduced relevant policies and plans to guide the development of the hydrogen energy industry. For example, the Medium - and Long-Term Plan for the Development of the Hydrogen Energy Industry (2021-2035), issued in February 2021, aims to clarify that the hydrogen energy industry is a strategic emerging industry and the key development direction of the future industry, coordinate the construction of infrastructure such as the system, storage, transportation and hydrogenation network, orderly promote the demonstration application of hydrogen energy in the field of transportation, expand diversified applications, and accelerate the exploration of commercialization paths. Gansu Province and its municipalities have also issued guiding policies for the hydrogen energy industry, including the "Guiding Opinions of the General Office of the Gansu Provincial People's Government on the Development of Hydrogen energy Industry" and the "Implementation Opinions on Accelerating the development of Hydrogen energy Industry" and other policies to provide legal protection, stipulating the development goals of the hydrogen energy industry, policy support and other requirements. It is helpful to promote the healthy development of hydrogen energy industry in Gansu Province.

### **2. Existing problems**

#### **(1) Imperfect laws and policies**

At present, China has no special legislation on hydrogen energy, scattered in energy-related laws and environmental protection laws. The lack of special legislative guarantee for the development of hydrogen energy has led to safety problems that are difficult to effectively manage and supervise hydrogen energy in the development process of the hydrogen energy industry. In addition, relevant policies are basically concentrated in the middle and downstream links, and the middle and upstream links not only have no special laws, but also rarely exist in local regulations.

#### **(2) Safety standards are not uniform**

China has initially established a hydrogen energy industry standard system, but its lack of systematization and cohesion. In terms of hydrogen storage and transportation safety standards, hydrogen, as a highly combustible gas, has certain safety risks in the storage and transportation process. Different countries and regions have different safety standards for hydrogen storage and transportation, resulting in safety risks. In terms of the safety standards of hydrogen filling stations, their safety standards are not uniform, involving the risk of hydrogen leakage, explosion and other aspects. In terms of hydrogen qualification certification standards, different countries and regions have different standards for safety training and qualification certification, resulting in inconsistent safety levels for practitioners.

### **3. Lack of regulatory bodies**

Regulators lack pertinence and foresight in formulating relevant policies and regulations, leading to inadequate supervision. The regulatory authorities have not enforced the law enough, imposed lax penalties on violations and lacked effective supervision and punishment mechanisms. In addition, coordination and cooperation among regulators are not close enough, information sharing is delayed greatly, and the efficiency and effectiveness of supervision work are greatly reduced. Therefore, it is urgent to strengthen the professional capacity training of regulatory authorities, increase law enforcement, establish a sound supervision mechanism, and strengthen inter-departmental communication and cooperation to ensure the healthy development of the hydrogen energy industry.

## **III. Analysis on the legal regulations of hydrogen energy revolution from the perspective of comparative law**

### **1. Empirical study on the legal regulations for the development of hydrogen energy industry in the region**

In 2020, in order to regulate hydrogen energy safety, Zhangjiakou promulgated the first domestic hydrogen safety supervision and management measures -- Zhangjiakou Hydrogen Energy Industry Safety Supervision and Management Measures. The measures cover the main points of safety management of the whole hydrogen energy industry chain. At the level of safety management, it clearly defines the responsibilities of each supervision and management department in the hydrogen energy industry chain, and specifies the safety management of enterprises, the operation points of safety and the management responsibilities of enterprises, and the specific requirements to the whole process of hydrogen energy production and operation.

### **2. Foreign experience in legal regulation of hydrogen energy science and technology**

After the carbon neutrality goal was proposed, the United States further regarded hydrogen energy as a key part of the national energy strategy system. The Reduction of Inflation Act, which went into effect in August 2022, provides additional policies and incentives for clean hydrogen. On September 22, 2022, the DOE's National Clean Hydrogen Strategy and Roadmap (Draft) identified the industrialization of hydrogen as a priority. In 2011, Japan put forward the goal of "hydrogen society" and related ways to achieve it. With the goal of carbon

neutrality, Japan has accelerated the development of hydrogen energy and continuously refined support policies in the field of hydrogen energy. In November 2021, the South Korean government proposed the latest national hydrogen energy goal of replacing crude oil imports with hydrogen imports by 2050 and covering large-scale industrial energy with hydrogen energy, and issued related industrial development plans. In 2020, the Law on Promoting Hydrogen Economy and Hydrogen Safety Management will be promulgated to promote the safe development of hydrogen economy. In a partial revision in June 2022, the government also proposed to build a full-cycle ecosystem centered on clean hydrogen by introducing a certification system at various levels.

#### **IV. Suggestions on improving the legal guarantee of regional hydrogen energy development in Gansu Province**

##### **1. Improve the top-level legislative design of the country**

First of all, promote and lead the legal protection of hydrogen technology in advance. We will promote the development of hydrogen energy through legislation, and formulate the Energy Transition Promotion Law. While promoting the development and transformation of hydrogen energy, it is necessary to pay attention to the protection of the interests of disadvantaged regions of hydrogen energy, to ensure that the disadvantaged regions of hydrogen energy do not reduce their profits due to high transformation costs, and strive to achieve a benign combination of improving the efficiency of energy transformation and improving hydrogen energy security.

Secondly, regulations should be implemented to ensure the development of hydrogen energy technology industry. Formulate supporting regulations to supplement and refine China's "Energy Law". Clarify the management departments of green hydrogen production and other links, and establish a unified and rapid approval policy and process. In terms of safety management, it is necessary to improve the whole process of hydrogen safety regulations and safety supervision system as soon as possible.

##### **2. Establish a regional legal policy system**

Gansu Province should make a detailed analysis of its advantages and disadvantages according to factors such as hydrogen energy industrial structure and economic development, and formulate a hydrogen energy development plan suitable for the province. In combination with the advantages and disadvantages of the province, the risks such as unstable supply of hydrogen energy and rising price of hydrogen energy may be fully predicted and prevented in the process of hydrogen energy development. At the same time, strengthen the legislative design of hydrogen energy, including the basic principles of hydrogen energy industry development, industrial access and other provisions, to provide legal protection for the development of hydrogen energy industry.

##### **3. Establish guidelines on safety standards**

It is necessary to clarify the safety management requirements and division of responsibilities for the hydrogen energy industry, and establish and improve safety regulatory bodies for the hydrogen energy industry. Safety standards and technical specifications for the hydrogen energy industry should be strictly formulated, including safety requirements for hydrogen storage, transportation and other links. It is necessary to give full play to the professional and technical capabilities of employees in the hydrogen energy industry, strengthen the safety inspection and monitoring of hydrogen energy industry facilities, and promptly discover and eliminate safety hazards.

##### **4. Strengthen supervision and regulation**

First, strengthen the supervision of the hydrogen energy industry to ensure that enterprises comply with safety norms during production, storage and transportation to prevent accidents. Second, establish and improve the access system for the hydrogen energy industry, and conduct strict qualification audits on enterprises to ensure they have the necessary technical and equipment conditions. At the same time, the inspection and evaluation of hydrogen energy facilities should be strengthened to find and solve potential safety hazards in a timely manner. In addition, monitoring and evaluation of the hydrogen energy industry will be strengthened to keep abreast of the industry's development and provide a scientific basis for the government to formulate relevant policies. Finally, the training and education of employees in the hydrogen energy industry should be strengthened to improve their safety awareness and skill level to ensure that they can properly operate and handle related equipment and materials.

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This paper is the research results of the 2023 College Students' Innovation and Entrepreneurship Training Program, the project name is "Empirical Research on the Rule of Law Guarantee of Hydrogen energy Technology Industry in Gansu", project number: S202313511015.