Achievements and Vision of
Korea's Hydrogen Economy Policy

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Ministry of Trade,
Industry and Energy

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Chapter 1

ACHIEVEMENTS AND VISION OF
KOREA'S HYDROGEN ECONOMY POLICY

The role of Hydrogen Economy in the Carbon Neutral Era

1 Hydrogen reacts with oxygen to produce heat and electricity, **Eco-friendly energy** that discharges only water as a by-product without harmful substances such as particulate matters and greenhouse gases

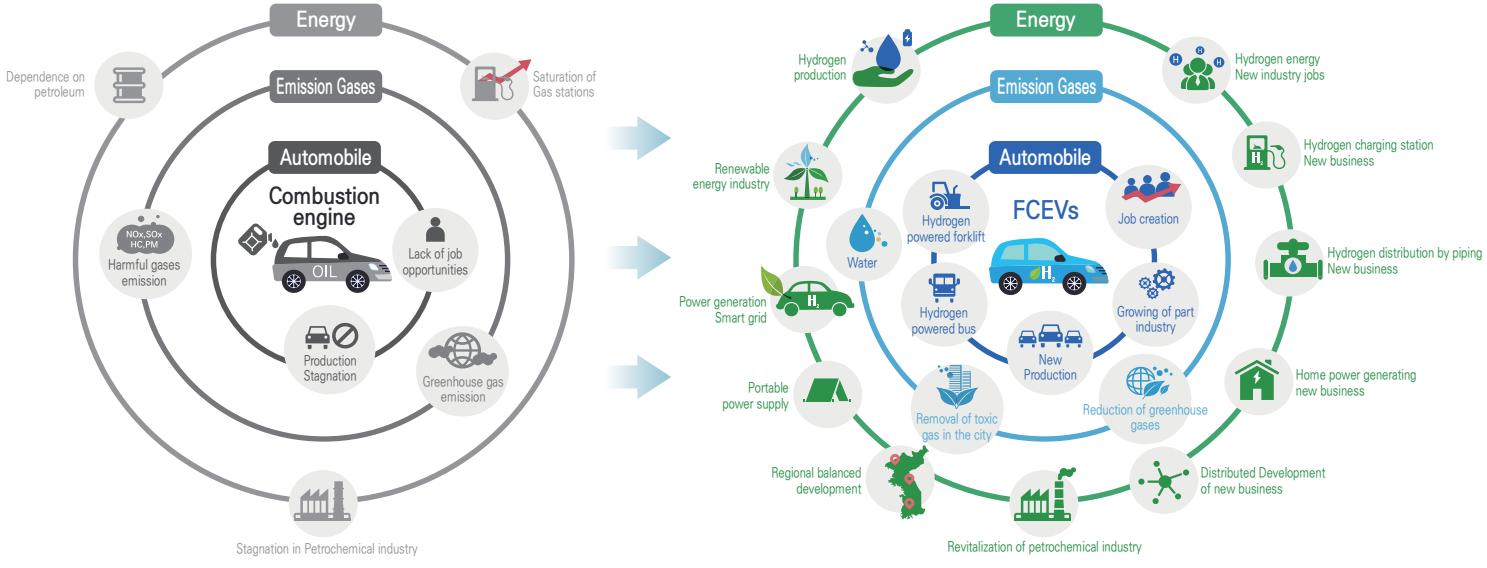
2 **Creating a Neutral Ecosystem** by using hydrogen produced from carbon-free power sources such as green hydrogen throughout the industry, including power generation (fuel cells, H_2 gas turbines), storage (ESS), transportation (FCEVs, trains, ships), and industrial processes (raw materials, combustion)

3 Opportunity to **create new eco-friendly industries** and **decarbonization of traditional industries** by utilizing energy production-delivery-consumption (industry/buildings/transportation)

4 It is a medium that complements the intermittent and variability of renewable energy such as solar and wind power, and converts electricity, which is produced and consumed in real time, into hydrogen, **enabling long-term and large-capacity storage of energy**.

5 It is possible to secure an energy source with its own technology and **reduce dependence on energy imports** as an alternative to fossil fuel consumption.

What we are now ▶ **What our future looks like**



Achievements of Korea's hydrogen economy

1. Announcement of the vision for becoming a leading country in hydrogen economy



The Korean government announced the **"Hydrogen Economy Roadmap"** in January 2019, identifying that the future growth potential of the hydrogen economy and its growth potential is sufficient, and announced a vision for leaping to become a leader in the hydrogen economy.

After the roadmap was announced, measures were sequentially established and promoted in each field, such as standards, FCEVs, refueling stations, R&D, pilot cities, safety, and ecosystems.

when	field	policy	main contents
'19. 4	Standards	Hydrogen economy standardization Strategic Roadmap	Proposal of more than 15 international standards by 2030, acquisition of KS certification for more than 30 items, development of integrated standards linked to R&D and international standardization, etc.
'19.10	FCEVs	Future automotive industry development strategy	Aim to become the world's No. 1 in electric and hydrogen vehicle supply and achieve 10% of the global market share; Launch of all types of eco-friendly cars, provide subsidies for eco-friendly cars, and build the related infrastructure
'19.10	Refueling Station	Measures for building hydrogen infrastructure and refueling stations	Preparing measures to build infrastructure for hydrogen supply and refueling based on economic feasibility, convenience, and safety, and developing a regional hydrogen supply plan and standard model for hydrogen refueling stations
'19.10	R&D	Hydrogen technology development roadmap	Production/Storage/Transportation/Distribution/Power Generation/Industry/Safety/ Environment/Infrastructure, etc. Systematization of technology development strategy through the setting of visions for each field and corresponding tasks
'19.10	Pilot city	Hydrogen pilot city program	By 2040, about 30% of local governments across the country will be converted into hydrogen cities to establish a hydrogen ecosystem in the city and achieve substantial transformation of the energy supply system.
'19.12	safety	Establishment of Comprehensive Measures for Hydrogen Safety Management	Establish a legal basis for hydrogen safety management and an entire cycle management system for each hydrogen value chain, and implement a safety management system for refueling stations, hydrogen producers, fuel cells, and R&D facilities
'20.7	Eco system	Preparation of measures to strengthen the competitiveness of the hydrogen industry ecosystem	'Secure a 100MW clean hydrogen mass production capacity by 2030, fostering 1,000 hydrogen specialized enterprises by 2040, and hydrogen production facilities for stable hydrogen supply

In February 2020, **the「Hydrogen Economy Promotion and Hydrogen Safety Management Act (Hydrogen Act)」** was enacted and promulgated for an independent legal basis to systematically and continuously promote the hydrogen economy policy and lay the foundation for the vitalization of the hydrogen industry.

* (Main contents) Establishment of a master plan for implementing hydrogen economy, a system for implementing hydrogen economy as Hydrogen Economy Committee and institutions in exclusively for Hydrogen(Promotion, Distribution, Safety), laying a foundation for the hydrogen industry such as hydrogen specialized enterprises/human resources/technology development/standardization/H_2 specialized complex, hydrogen ecosystem Safety management, etc. The law composed of a total of 8 chapters and 62 articles

In July 2020, the **Hydrogen Economy Committee** was launched, a control tower for the Korean hydrogen economy that deliberates and resolve on major policies related to the hydrogen economy in Korea.

The Prime Minister is the chairperson, and it is composed of the ministers of eight related ministries and the best private experts in each field, including industry, academia, and civic organizations.

order	Proposing agenda
1st ('20.7)	① Measures to strengthen the competitiveness of the hydrogen industry ecosystem ② Implementation Status of Hydrogen technology development and its future plans ③ Achievement of the supply of FCEVs and refueling station and its future plans ④ Current status of hydrogen city projects and its expansion strategy ⑤ Designation of institutions in exclusively for hydrogen economy ⑥ Amendment of the hydrogen economy committee operating rules
2nd ('20.10)	① Measures for the introduction of CHPS (Clean Hydrogen Portfolio Standards) ② Measures to secure the competitiveness of extracted hydrogen ③ Measures to establish a master plan for the creation of hydrogen pilot cities and enact related laws ④ Implementation status of follow-up measures of the 1st Hydrogen Economic Committee ⑤ Measures to enact subordinate statutes of the Hydrogen law
3rd ('21.3)	① Plans for private investment in the hydrogen economy (total of 43 trillion won by 2030) and government's support plan ② 2021 business plan of Institutions in Exclusively for the hydrogen economy ③ Construction Plan for Seoul Hydrogen Experience Museum
4th ('21.11)	① 1st Master Plan for implementing the Hydrogen Economy ② Plan for Strategic Deployment of Hydrogen refueling Stations ③ A plan to create ports specializing in hydrogen transport ④ Development plan for green hydrogen production technology using marine renewable energies ⑤ Promotion status and plans for the special regulatory free zones for the Hydrogen Industry

'In August of 2021, the position of **'General Director of Hydrogen Economy Policy'** was newly created in **the Ministry of Trade,** Industry and Energy to take charge of the hydrogen economy revitalization, such as infrastructure construction, institutional improvement, and investment support.



In November of '21, **the "First Master Plan for implementing the Hydrogen Economy"** was established, a statutory plan that includes supply and demand plans, system operation, financing, and infrastructure based on the Hydrogen Act.

Vision & Goal

Leading the Hydrogen Economy by Establishing an Ecosystem across the Entire Cycle of the Hydrogen Economy

- Transition of supplying the Clean Hydrogen
- Securing Efficient Hydrogen Storage and Transportation
- Diversifying the Use of Hydrogen
- Strengthening the Base for Fostering the Hydrogen Industry

4 strategies and 15 tasks

1 Leading Domestic and Overseas Clean Hydrogen Production

1. Green Hydrogen Production
2. Blue Hydrogen Production
3. Overseas Clean Hydrogen Production

2 Build a nationwide infrastructure

1. Establishment of Hydrogen Distribution Infrastructure
2. Construction of Hydrogen Pipeline Network
3. Accelerating the Deployment of Hydrogen Refueling Stations

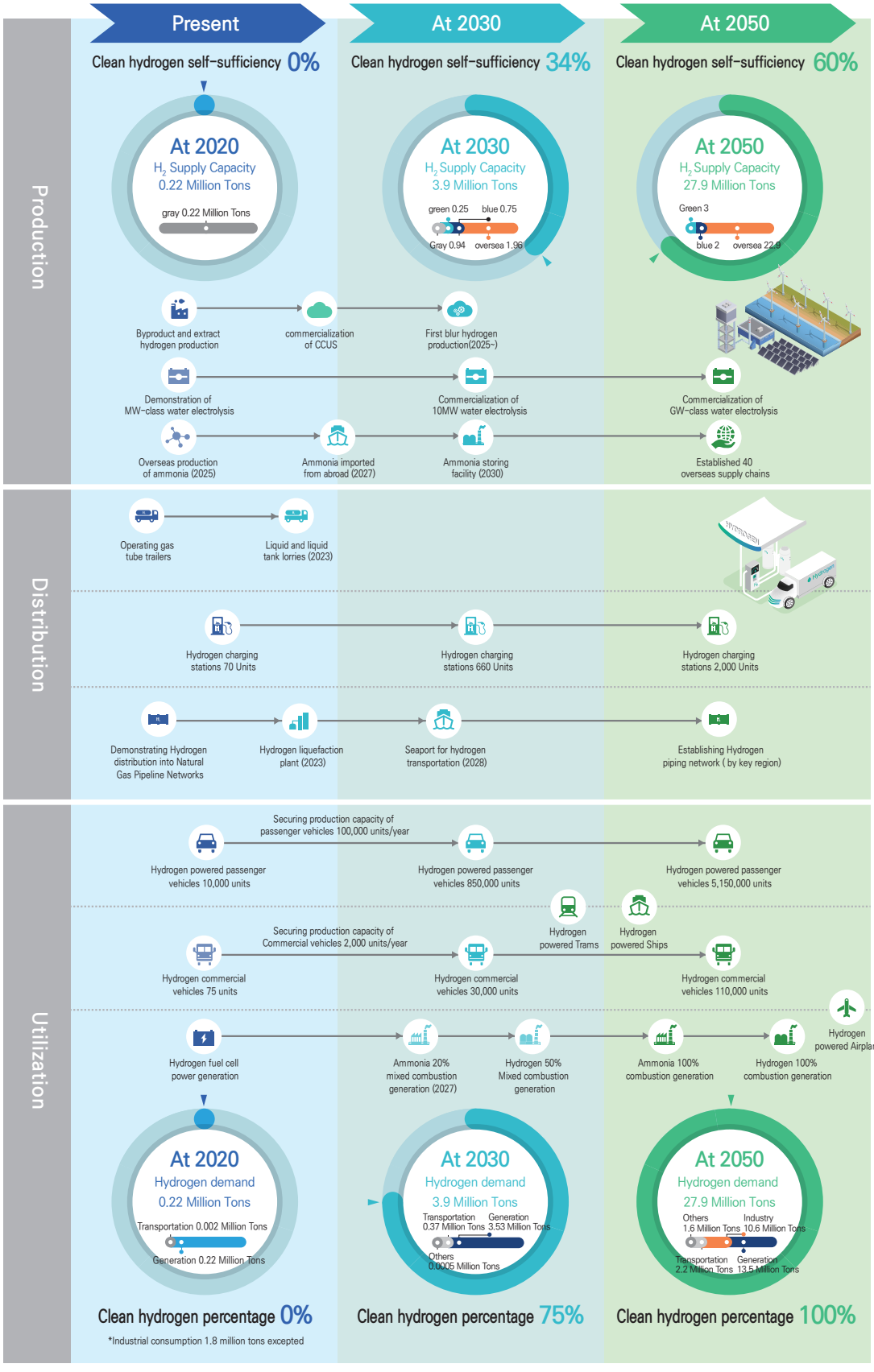
3 Using hydrogen in daily life

1. Full Scale Expansion of Hydrogen Power Generation
2. Leading the Global Hydrogen Mobility Market
3. Laying the Foundation for Hydrogen Utilization in the Industrial Field

4 Strengthening Hydrogen Ecosystem

1. Technology Development, Human Resource Training, Standardization
2. Securing the No. 1 Position in Hydrogen Safety Management
3. Leading Global Cooperation
4. Hydrogen-Specialized Enterprises and Finanacial Revitalization
5. Expansion of Hydrogen Clusters, Citie, Regulatory Free Zones
6. Improving Policy Base and Public Acceptance

Key Milestones



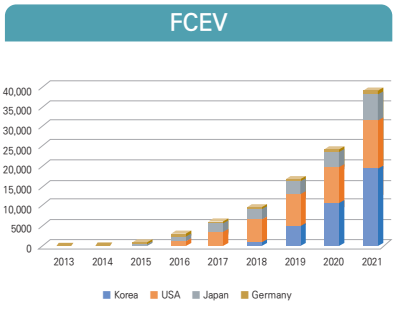
2. Taking the No.1 position in expanding hydrogen utilization industry

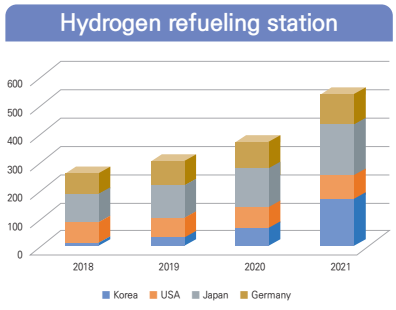
Recorded the world's highest growth rate in the three major fields of hydrogen use: FCEVs, fuel cell power generation, and hydrogen refueling stations.

- **In 2021, the cumulative supply of FCEVs in Korea is 19,404**, and the export of Passenger FCEVs and hydrogen trucks to overseas countries were accomplished.
  * Accumulated supply of FCEVs in '21: (Korea) 19,404 units (USA) 12,188 units (Japan) 6,704 units (Germany) 853 units (Source: Ministry of Land, Infrastructure and Transport, Marklines)

- **Fuel cell power generation capacity* distributed in Korea is the largest in the world at 767.5MW**, and at the end of September 2021, Doosan Fuel Cell exported fuel cells for power generation (1.8MW, worth KRW 14 billion) to China.
  * Source: Korea Energy Agency

- **The number of hydrogen refueling stations***, the core infrastructure of hydrogen mobility, **has increased by 1,114% over the past four years, with 170 installed as of 2021**. * Source: Ministry of Environment





3. Strengthening Hydrogen Industry Ecosystem and Technological Capabilities

In order to preoccupy the hydrogen economy, which is in the early stage of the world, the Korean government is **expanding investment in all fields of the hydrogen economy**.

* Expansion of government R&D budget support: KRW 75 billion in 2017 → KRW 1.34 trillion in 2022 (about 18 times)

In particular, **through R&D investment**, the Korean governments are intensively supporting the technology development of hydrogen-related basic and source technologies and technology commercialization, and are striving to secure **the world's best technology**.

* Water electrolysis technology development : 500kW (2017~2021) → 2MW (2019~2023) → 3MW (2020~2023)
* ① The efficiency of fuel cell system for FCEV : 60%, Durability : 160,000km, ② Fuel cell power generation efficiency 49%, overall efficiency 85%

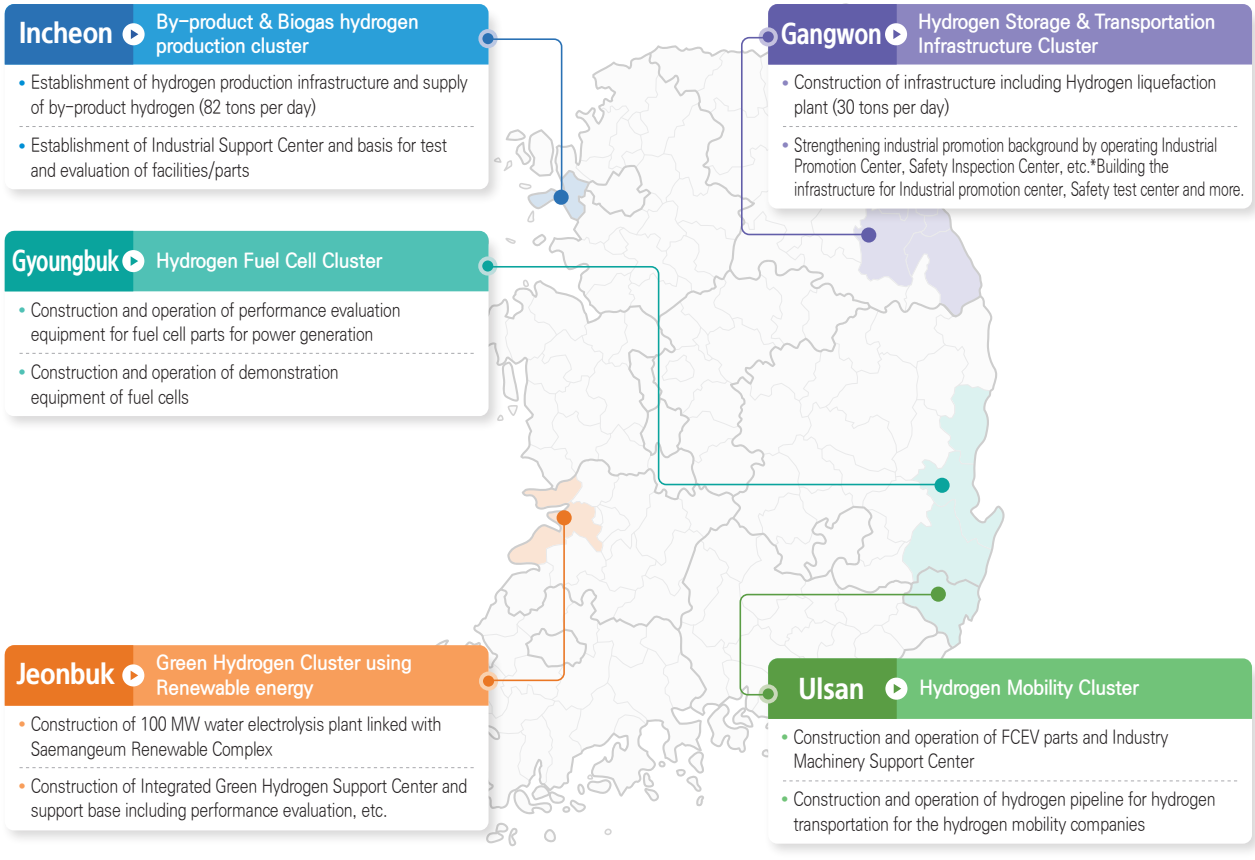
Designated hydrogen-specialized enterprises with technological and innovation capabilities by evaluating revenue, the share of R&D expenditure etc among domestic hydrogen related companies, and **provided business support services** such as material/part/equipment R&D, management/technical consulting, etc.

* 32 selected as of May. 2022
* Targets of fostering hydrogen - specialized companies: (2025) 100 → (2030) 500 → (2040) 1,000

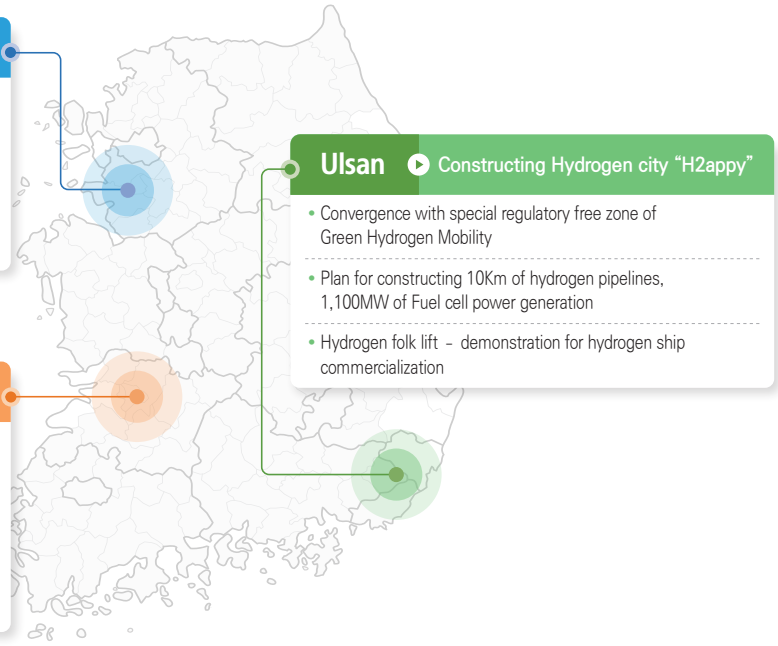
In addition, an efficient and strategic hydrogen economy implementation system was established by **creating specialized hydrogen ecosystem for each base in connection with regional properties and existing regional industries**.

* Designated hydrogen clusters (Incheon, Ulsan, Gyeongbuk, Jeonbuk, Gangwon, etc.), hydrogen pilot cities (Ulsan, Jeonju/Wanju, Ansan, etc.), special regulatory zones (Ulsan, Gangwon, Chungnam, Chungbuk, etc.)

Hydrogen cluster



Hydrogen Pilot City



Ansan — Global Hydrogen City, ECO ANSAN

- Transformation of municipal energy paradigm using hydrogen
- Hydrogen production (LNG Reforming) → Transportation (Pipeline) → Utilization (Building, employment, etc.)
- Demonstration of green hydrogen production using the renewable energy from SIWHA Solar plant

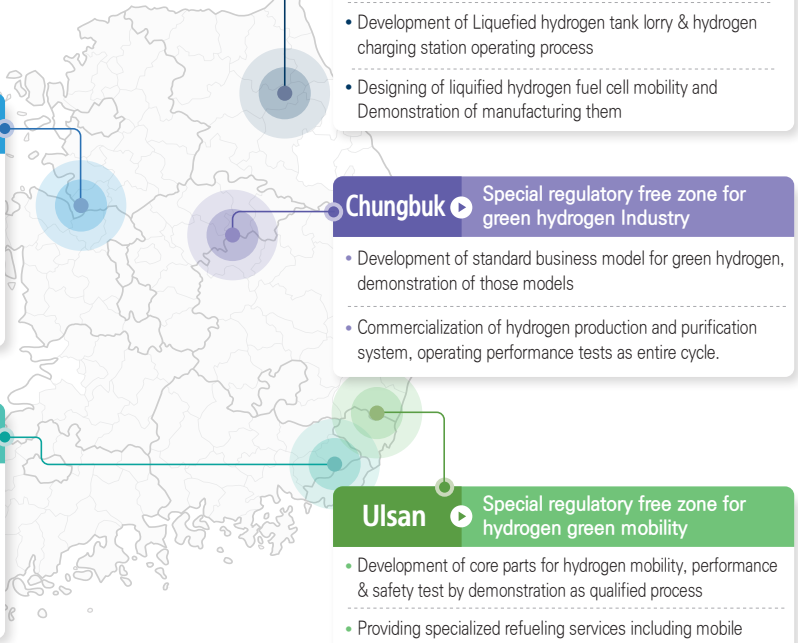
Ulsan — Constructing Hydrogen city "H2appy"

- Convergence with special regulatory free zone of Green Hydrogen Mobility
- Plan for constructing 10Km of hydrogen pipelines, 1,100MW of Fuel cell power generation
- Hydrogen folk lift - demonstration for hydrogen ship commercialization

Jeonju & Wanju — "Regional Customized" Hydrogen Energy City

- Jeonju City ▸ Hydrogen Utilization & Promotion City
  Wanju City ▸ Construction of hydrogen production base and Metropolitan Supply Center
- Operating 49 Hydrogen buses, supply fuel cells for building to 408 households in apartments
- Development of fuel cell power pack technology and demonstration of the technology linked with smart farm

Special regulatory Zone



Gangwon — Special regulatory free zone for liquefied hydrogen industry

- Reviewing, designing and constructing of Safety standard for facilities related to liquefied hydrogen production and storage
- Development of Liquefied hydrogen tank lorry & hydrogen charging station operating process
- Designing of liquified hydrogen fuel cell mobility and Demonstration of manufacturing them

Chungnam — Special regulatory free zone for hydrogen energy transition

- Demonstration of SOFC Power generating system
- Development of hydrogen inspection unit by its weight to ensure transparent distribution of hydrogen refueling station as core infrastructure
- Development of liquified hydrogen unit and liquid hydrogen container for drone flying

Chungbuk — Special regulatory free zone for green hydrogen Industry

- Development of standard business model for green hydrogen, demonstration of those models
- Commercialization of hydrogen production and purification system, operating performance tests as entire cycle.

Busan — Special regulatory free zone for Ammonia as renewable energy source

- Certification of hybrid and eco-friendly ship powered by Ammonia based fuel cell
- Demonstration of mobile liquified ammonia container
- Demonstration of safety test for Bunkering technology of ammonia as marine fuel

Ulsan — Special regulatory free zone for hydrogen green mobility

- Development of core parts for hydrogen mobility, performance & safety test by demonstration as qualified process
- Providing specialized refueling services including mobile hydrogen refueling station, Etc.
- Demonstration of small-sized hydrogen powered ship equipped with hydrogen fuel cell

In order to revitalize the hydrogen economy and foster related industries
- Reducing rent fee for installing a hydrogen refueling station on a site owned by a public institution
- Allowing self-refueling of hydrogen vehicle drivers, etc
- **Promoting regulatory innovation using the 'regulatory sandbox' system**, such as allowing self-refueling of hydrogen vehicle drivers.

* 36 cases of regulatory rationalization (regulatory sandbox) in the hydrogen sector has been made (as of May 2022)

4. Private companies have started to invest in the hydrogen economy in earnest

In March 2021, **major companies announced large-scale investment plans** in response to government policy directions.
① 11 trillion won for production including green and blue hydrogen, etc. ② 8 trillion won for storage and distribution including liquefaction plants, etc. ③ 23 trillion won for utilization including power generation and hydrogen mobility, etc.

The investment from private sector has been further expanding with the establishment of the 「The 1st Master Plan for the Implementation of the Hydrogen Economy」(November 2021) and the passage of the revision of the Hydrogen Act at National Assembly (May 2022).

[Major Companies' Investment Plans (Announced in Mar. 2021)]

Company	Investment field	Total Amount	Company	Investment field	Total Amount
SK	Liquified plant, fuel cell	18.5 trillion won	HANWHA	Water electrolysis, hydrogen hybrid power generation	1.3 trillion won
HYUNDAI motor	Hydrogen automobiles & related INFRA	11.1 trillion won	HYOSUNG	Liquefaction plant, liquefaction charging station	1.2 trillion won
POSCO	Hydrogen direct reduced Iron, Introduction of technology from overseas	10 trillion won	S&M companies	Fuel cell, hydrogen storage container	1.2 trillion won

Bold investment has been made not only in the **hydrogen utilization sector** with leading technology, but also in the **hydrogen production and distribution sectors** where have relatively technological gaps with leading countries.

- Water electrolysis technology R&D to early secure large-scale green hydrogen production technology
- New development of hydrogen storage container, establishment of hydrogen storage container production facility
- Ammonia-based clean hydrogen production pilot technology development
- Liquefied hydrogen plant and liquid hydrogen charging station construction, etc.

In September 2021, **with 17 Korean conglomerates**, investing in the hydrogen industry such as Hyundai Motor, SK, POSCO, Doosan, and Hyosung, **voluntarily launched the Korea H_2 Business Summit** and actively participated in **establishing a rapid and effective domestic hydrogen ecosystem**.

The Korea H_2 Business Summit will **hold the Investor Day** in Seoul on July for global hydrogen energy-related companies and overseas institutional investors to **announce investment plans** for each company

5. Raising the national competitiveness in the global hydrogen industy through international cooperation

The Korean government has **signed an MOU for hydrogen economy cooperation** with the governments of major countries that are aiming for an hydrogen economy, and is **participating in the expansion of the global hydrogen economy**.

Norway	• Signed MOU for hydrogen economy and low carbon technology cooperation
Austrailia	• Signed MOU for clean hydrogen economy cooperation
UAE	• Signed MOU for hydrogen economy cooperation
Saudi Arabia	• Signed MOU for hydrogen economy cooperation
Israel	• Signed MOU for hydrogen economy cooperation
Chile	• Signed MOU for low carbon hydrogen economy cooperation

Korean companies are putting effort to enter into the global hydrogen market **through strategic alliances with global companies through M&A (Mergers and Acquisitions)**.

HYUNDAI MOTORS	• Established H2E for the purpose of distributing hydrogen commercial vehicles and HHM, a joint venture for hydrogen trucks in Switzerland
SK	• Acquisition of shares of PLUG POWER Inc. that holds technologies such as water electrolysis and liquefied hydrogen plants • Establishment of joint fund and joint venture with GEELY Motors • Promotion of establishment of a joint venture with Monolith, a turquoise hydrogen production company
Hanwha Chemicals	• Acquired stakes of PSM and ATH, both of which have hydrogen-mixed combustion gas turbine technology.
Hanwha Solution	• Acquired 100% stakes of Cimarron, a US high-pressure tank company to secure hydrogen tank technology
S-Oil	• Securing a 20% stake in FCI(Fuel Cell Innovation), a joint venture between Korea and Saudi Arabia
Hyosung Heavy Industry	• Signed a JV investment contract with Linde(Germany) to build a liquid hydrogen value chain
Lotte Chemical	• Promoting the establishment of a joint venture with Air Liquide(France) to build a hydrogen supply network

Exporting FCEVs and fuel cells, and supplying hydrogen refueling stations to overseas based on Korea's technology

USA	• (HYUNDAI MOTORS) Plan to supply 30 hydrogen trucks supported by the state of California (from the second quarter of 2023) • (HYUNDAI MOTORS) Promoting the construction of 48 hydrogen refueling stations with Royal Dutch Shell in California • (HYUNDAI MOTORS) Signed an MOU for hydrogen commercial vehicle development cooperation with Cummins, a commercial vehicle engine company • (Doosan Mobility Innovation) Promotion of hydrogen drone development with Microsoft
Canada	• (Doosan Fuel Cell) Signed an MOU for onshore hydrogen mobility cooperation with Ballard-HyAxiom
Switzerland	• (HYUNDAI MOTORS) Exported 46 Xcient hydrogen trucks (1,600 to be exported by 2025)
China	• (HYUNDAI MOTORS) Started construction of the first overseas hydrogen fuel cell production base in Guangzhou in 2021
Austrailia	• Signed multilateral MOU for hydrogen bus demonstration project * (Korea) H2KOREA, HYUNDAI MOTORS, Hyundai Glovis, Hyosung Heavy Industries,Kohygen / (Australia) Macquarie, ARCC, Comfort Delgro, Omni Tanker
New Zealand	• (HYUNDAI MOTORS) Exported 1 hydrogen truck for the demonstration project of hydrogen commercial vehicle supported by the New Zealand government (plan to export 5 units by the end of 2022)
France	• (HYUNDAI MOTORS) Signed MOU for cooperation with Air Liquid and ENGIE to expand hydrogen vehicle and charging infrastructure

Cooperation to establish **a stable and cost-effective hydrogen supply chain and diversify trade routes** is in progress

Austrailia	• HYUNDAI MOTORS-FMG-CSIRO signed an MOU on hydrogen supply infrastructure cooperation • MOU signed among POSCO-FMG-ORIGIN for green hydrogen production and V/C cooperation
UAE	• Established GS Energy & ADNOC for Blue Ammonia Supply Chain Business Partnership • Korea National Oil Corporation, SK Gas, and ADNOC for Low-Carbon Hydrogen-Ammonia Joint Research (JSA) Implementation
Saudi Arabia	• Hyundai Heavy Industries and Aramco signed an MOU for hydrogen ammonia production and utilization cooperation • KEPCO & Aramco signed an MOU for blue hydrogen and ammonia development cooperation • Signed an MOU for feasibility study and promotion of green hydrogen development among POSCO, Samsung C&T, and PIF • Hyundai Oilbank & Aramco signed an MOU for blue hydrogen and ammonia development cooperation • S-Oil & Aramco Signed an MOU for cooperation to build hydrogen supply chain
Malaysia	• Samsung Engineering, Lotte Chemical, POSCO, and SEDC signed an MOU to develop a clean hydrogen project in Sarawak
Oman	• Korea Gas Technology Corporation & Oman Petroleum Company OQ Company signed MOU for commercialization of renewable energy green hydrogen and ammonia
France	• Signed MOU with POSCO & France energy company ENGIE for hydrogen supply chain project development

Strengthening cooperation between foreign government agencies, companies, and associations and establishing the Global Hydrogen Industrial Association Alliance (GHIAA) to expand the hydrogen economy in a private level.

H2KOREA

- (Launching GHIAA) Promotion of public-private hydrogen industry support and support for fostering new industries through the launch of GHIAA

* Korea(H2KOREA), USA(FCHEA), Canada(CHEFCA), Chile(H2CHILE), France(Afhypac), UK(UKHFCA), Spain(AeH2), Netherlands(NWBA), Norway(NHF), China(IHFCA), Singapore (HFCAS), Australia (AHC), Colombia (Hydrogen Colombia), Argentina (H2ar), Denmark (Hydrogen Denmark), Sweden (Hydrogen Sweden), Germany (DWV), Europe (Hydrogen Europe)

- (Signing an MoU) Expanding and strengthening hydrogen cooperation in the entire value chains by forming global partnerships and expanding networks (16 organizations in 13 countries)

* USA(FCHEA), Europe(Hydrogen Europe), Germany(DWV, Fraunhofer), UK(British Embassy in Korea), Canada(CHFCA), Qatar(Qatar Energy), France(Task Force Hydrogen), Saudi Arabia(Aramco, ACWA Power), China (CSAE), Australia (AHC), Denmark (Hydrogen Denmark), Sweden (Hydrogen Sweden), Norway (Innovation Norway, NORWEP)



Chapter 3

ACHIEVEMENTS AND VISION OF
KOREA'S HYDROGEN ECONOMY POLICY

The new government's hydrogen economy strategy

A preemptive and comprehensive response is required due to the growing **global resource uncertainty**, such as the recent Russia-Ukraine crisis and the expansion of weaponization of resources. Therefore, the **transition to a hydrogen economy is essential** that can **solve high oil prices and carbon neutrality as well as resource security** at once.

In the future, Korea will **balance the development of entire value chain of hydrogen economy** including **production, distribution and utilization** to realize **a clean hydrogen-based hydrogen economy**. 「The 1st Master Plan for the Implementation of the Hydrogen Economy」 will be **gradually implemented** by considering the economic feasibility and technological maturity

Production

Diversification of hydrogen production methods and establishment of domestic and overseas production bases

- (Domestic) Developing and demonstrating water electrolysis technology in connection with renewable energy* and nuclear power**; Construction of a blue hydrogen plant using LNG and demonstration of CCS technology, Introduction of clean hydrogen certification system
  * Demonstrating renewable energy with scale of 10MW (2022~2026) and 100MW (Jeonbuk Saemangeum, 2023~2027) Considering establishment of large-scale green hydrogen production base(energy island) infrastructure
  ** Reviewing demonstration based on a basic research of hydrogen production with nuclear power (2022~2024)
- (Overseas) Promoting feasibility studies and pilot projects for overseas hydrogen production with domestic capital and technologyActivating international cooperation channels and strengthening private and public cooperation

Distribution

Prepared infrastructure to seamlessly connect production and utilization sectors

- (Recieve/Storage) Build infrastructure such as ammonia/liquid hydrogen receiving bases and storage facilities by utilizing existing oil stockpiling bases and LNG receiving bases
- (Piping) Promote commercialization so that the general public can use hydrogen on a daily basis by demonstrating the hydrogen blending into municipal gas pipelines (a target of 20%)
- (Refueling stations) Expand deployment of fusion hydrogen refueling stations that operate distributed power generation such as solar and fuel cells and install hydrogen and electric charging stations by utilizing existing gas stations and LPG charing stations

Utilization

Expand hydrogen mobility centered on commercial vehicles such as hydrogen buses and trucks, and hydrogen power generation such as ammonia co-fired in earnest

- (Transportation) Focus on deployment of hydrogen commercial vehicles and technology development for hydrogen vessels, drones, etc.
  * Produce 100,000 passenger vehicles and 2,000 commercial vehicles annually by 2025
- (Power Generation) Develop/demonstrate and improve regulation for hydrogen and ammonia power generation technologies, supply ditributed fuel cells, and establish bidding market for hydrogen power in connection with the restructuring of electric power market
  * Promote commercialization after demonstration of coal-ammonia co-firing and LNG-hydrogen co-firing manly by KEPCO and public power generation companies
- Establish hydrogen clusters in Incheon, Jeonbuk, Gangwon, Ulsan, and Gyeongbuk (2027)

The revision of the Hydrogen Law was passed standing committee of the National Assembly in May 2022, and it is expected to further activate **the establishment of an ecosystem focused on clean hydrogen** and **development of the hydrogen industry**.

* (Main contents of the amendment) △ New regulations on the definition of clean hydrogen, △ Introduction of a clean hydrogen certification system based on CO_2 emission, △ Imposing obligations for selling and using clean hydrogen to refueling stations and industries, △ Establishment of a bidding market for purchase and supply of hydrogen power generation, etc.

[Reference] Current status of hydrogen specialized companies

No	Company name	Homepage URL	Main products	Region
1	Doosan Fuel Cell	www.doosanfuelcell.com/kr	Fuel cell for power generation	Junbuk
2	WONIL T&I	www.woniltni.co.kr	Hydrogen reformer, Hydrogen storage alloy	Gyungggi
3	S Fuelcell	www.s-fuelcell.com	Fuel cell for home & buildings	Gyungggi
4	Bumhan fuelcell	www.bumhanfuelcell.com	Fuel cell for home & buildings	Gyungnam
5	ENERGY & MARINE SOLUTION	www.yesems.co.kr	Design/ construction of hydrogen refueling station	Gyungnam
6	DAEHA Co., Ltd.	www.dh06.co.kr	Compressor for hydrogen refueling station	Busan
7	JNTG	www.thejnt.com	Fuel cell	Gyungggi
8	Guardnec Co., Ltd.	www.guardnec.com	Electrolyte membrane	Gyungggi
9	Hiairkorea Co., Ltd.	www.hiairkorea.co.kr	Fuel cell	Gyungnam
10	YUHAN PRECISION CO., LTD.	www.yuhantool.co.kr	Fuel cell	Choongnam
11	G-Philos Co., Ltd.	www.g-philos.co.kr	Fuel cell	Gyungggi
12	M&S KOREA.CO., LTD.	-	Fuel cell	Gyungggi
13	SDG Co., Ltd.	www.sdg.co.kr	Hydrogen gas	Ulsan
14	K TECH Co., Ltd.	-	Design/manufacture of reformer system	Choongnam
15	SAMJUNG ENC	www.speedchiller.com	Chiller for hydrogen refueling station	Gyungggi
16	Valmax Technology Corporation	www.valmax.co.kr	Design/construction of hydrogen refueling station	Choongnam
17	Smart Grand Technology	www.sgt.ne.kr	Hydrogen refueling facilities	Gyungggi
18	NEXPLUS Co., Ltd.	www.nexplus.co.kr	Fuel cell porous body for FCEV	Choongnam
19	annpartners co., Ltd.	www.annpartners..com	Construction of fuel cell for power generation	Seoul
20	ESQUARE E&C Co., Ltd	-	Supply/construction of fuel cell for building	Daejun
21	LK Energy Co., Ltd.	www.lke.kr	Supply/construction of fuel cell for building	Gyungggi
22	SAMCHAN Energy	-	Manufacture of refueling facilities / hydrogen compressor	Seoul
23	YOUNGDO IND. CO., LTD.	www.youngdovalve.com	Manufacture of hydrogen container valve for FCEV	Busan
24	CNL Energy	www.cnl.co.kr	Manufacture of fuel cell stacks performance test device	Seoul
25	SPG Industry Co., Ltd.	www.spgdream.com	Hydrogen gas	Gyungggi
26	SPG Hydrogen Co., Ltd.	www.spgdream.com	Hydrogen gas	Choongnam
27	CHANGSHIN Chemical Co., Ltd.	www.changshinchem.co.kr	Distribution of high purity hydrogen gas	Jeonnam
28	SEYANG ENG.	www.seyang.com	Construction of fuel cell for building	Seoul
29	KNP Corporation	www.knpcorporation.com	Supply fuel cell separator for buildings	Gyungggi
30	JIS Co., Ltd.	www.jis1.kr	Renovation of fuel cell system reformer for building	Daejun
31	DESTIN Power	www.destin.co.kr	Manufacture of fuel cell parts for power generation and buildings	Jeonnam
32	ILJIN Hysolus	www.hysolus.co.kr	Hydrogen storage container for FCEV	Junbuk

[Reference] Current status of regulatory rationalization in the hydrogen sector regulatory sandbox

No	Regulatory Improvement	Sector	Department
1	Clarification of taxation system for local tax related to fuel cell power generation	Fuel cell	Ministry of Trade, Industry and Energy, Ministry of Interior and Safety
2	Permission for mobile refueling stations to expand hydrogen refueling infrastructure	Hydrogen refueling station	Ministry of Trade, Industry and Energy
3	Relaxation of pressure and volume restrictions on tube trailers for transporting compressed hydrogen	Trasportation & Storaging	Ministry of Trade, Industry and Energy
4	Establishment of standard for installation of liquid hydrogen refueling station	Hydrogen refueling station	Ministry of Trade, Industry and Energy
5	Improvement of certification standards for hydrogen electric vehicle parts	Hydrogen Electric Vehicle	Ministry of Land, Infrastructure and Transport
6	Permission for installation of hydrogen refueling stations in semi-residential and commercial areas	Hydrogen refueling station	Ministry of Land, Infrastructure and Transport
7	Permission for installation of hydrogen refueling stations in bus depots within limited development districts (green belt)	Hydrogen refueling station	Ministry of Land, Infrastructure and Transport
8	Relaxation of 30m separation distance regulation from the railway when installing hydrogen refueling station	Hydrogen refueling station	Ministry of Trade, Industry and Energy
9	The separation distance (50m) between hydrogen refueling stations and apartment houses has been revised to be the same as that of CNG charging stations (25m).	Hydrogen refueling station	Ministry of Land, Infrastructure and Transport
10	Allow installation of hydrogen refueling stations (exceeding 3,000㎡) without a decision from the urban planning facility	Hydrogen refueling station	Ministry of Land, Infrastructure and Transport
11	Allow self-refueling of hydrogen vehicle drivers	Hydrogen refueling station	Ministry of Trade, Industry and Energy
12	Increases the number of eco-friendly vehicles that can omit the emission gas certification for performance inspection and test operation	Hydrogen Electric Vehicle	Ministry of Environment
13	Allow advertisements at refueling stations of eco-friendly vehicles	Hydrogen refueling station	Ministry of Interior and Safety
14	Allow private contract to install eco-friendly vehicle refueling stations in state-owned and public land	Hydrogen refueling station	Ministry of Trade, Industry and Energy
15	Rationalization of safety standards for recently appeared hydrogen refueling stations(mother stations)	Hydrogen refueling station	Ministry of Trade, Industry and Energy
16	Permission for construction of the multi-layered hydrogen refueling station	Hydrogen refueling station	Ministry of Trade, Industry and Energy
17	Permission for installing manufacturing-type hydrogen refueling stations (self-manufacturing and refueling) in limited development districts (green belt)	Hydrogen refueling station	Ministry of Land, Infrastructure and Transport, Ministry of Trade, Industry and Energy
18	Permission for establishing hydrogen refueling stations in industrial facility areas within industrial complexes	Hydrogen refueling station	Ministry of Trade, Industry and Energy
19	Allow refueling of passenger vehicles at hydrogen refueling stations in public municipal bus depots	Hydrogen refueling station	Ministry of Land, Infrastructure and Transport
20	Resolving confusion about the maximum refueling pressure standard for hydrogen electric vehicles	Hydrogen Electric Vehicle	Ministry of Land, Infrastructure and Transport, Ministry of Trade, Industry and Energy
21	Permission for commercial establishment in hydrogen refueling stations	Hydrogen refueling station	Ministry of Trade, Industry and Energy
22	Easing restriction of location conditions for hydrogen refueling stations in municipal parks	Hydrogen refueling station	Ministry of Land, Infrastructure and Transport
23	Easing restriction of construction conditions for hydrogen refueling stations in sports facilities	Hydrogen refueling station	Ministry of Land, Infrastructure and Transport
24	Improvement of quality inspection system for hydrogen refueling stations	Hydrogen refueling station	Ministry of Trade, Industry and Energy
25	Improvement of regulations for expansion of fusion and hybrid hydrogen refueling stations	Hydrogen refueling station	Ministry of Trade, Industry and Energy
26	Improving unnecessary administrative procedures related to building hydrogen refueling stations in public property	Hydrogen refueling station	Ministry of Trade, Industry and Energy
27	Establishment of safety standards for liquid hydrogen storage and transportation	Trasportation & Storaging	Ministry of Trade, Industry and Energy
28	Easing special training for hydrogen vehicle drivers	Hydrogen Electric Vehicle	Ministry of Trade, Industry and Energy
29	Allow installation of hydrogen refueling stations in auxiliary facilities such as truck depots in green belt area	Hydrogen refueling station	Ministry of Land, Infrastructure and Transport
30	Easing qualification requirements for installing hydrogen refueling stations in green belt area	Hydrogen refueling station	Ministry of Land, Infrastructure and Transport
31	Allowing to carry out surplus hydrogen from manufacturing-type hydrogen refueling stations in green belt area	Hydrogen refueling station	Ministry of Land, Infrastructure and Transport
32	Preparation of hydrogen train technology standards	Hydrogen train	Ministry of Land, Infrastructure and Transport
33	Improvement of KS Certification Acquisition System for valves for hydrogen refueling stations	Hydrogen refueling station	Ministry of Trade, Industry and Energy
34	Allowing installation of retail stores for hydrogen refueling stations within limited development districts (green belt)	Hydrogen refueling station	Ministry of Land, Infrastructure and Transport
35	Reducing rental fee for installing a hydrogen refueling station within a site owned by a public institution	Hydrogen refueling station	Ministry of Trade, Industry and Energy
36	Clarification of fuel cell facility licensing standards	Fuel cell	Ministry of Land, Infrastructure and Transport

Achievements and Vision of
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