

# The current progress of the Hydrogen Industry Promotion Policy in Chungnam

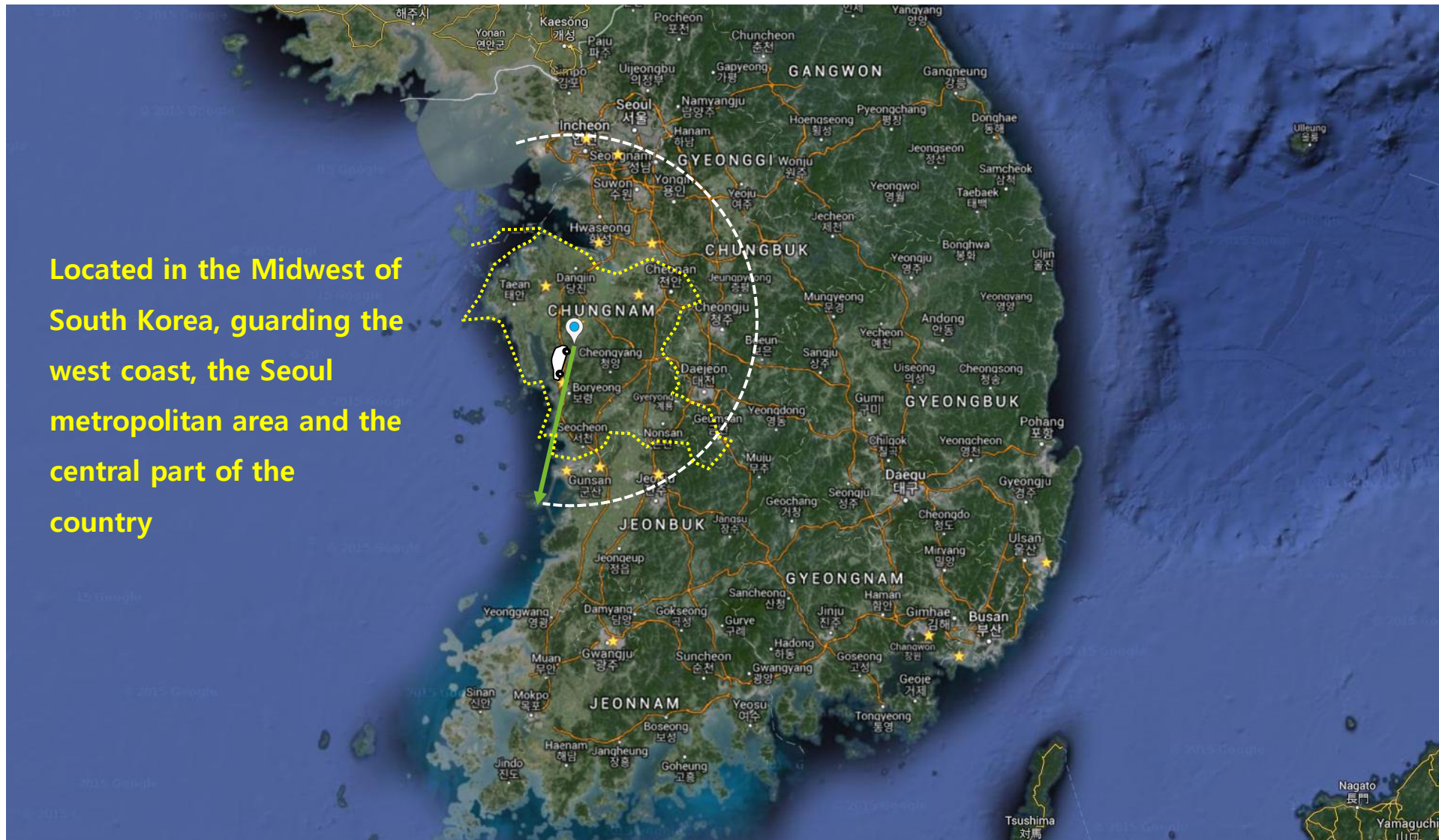
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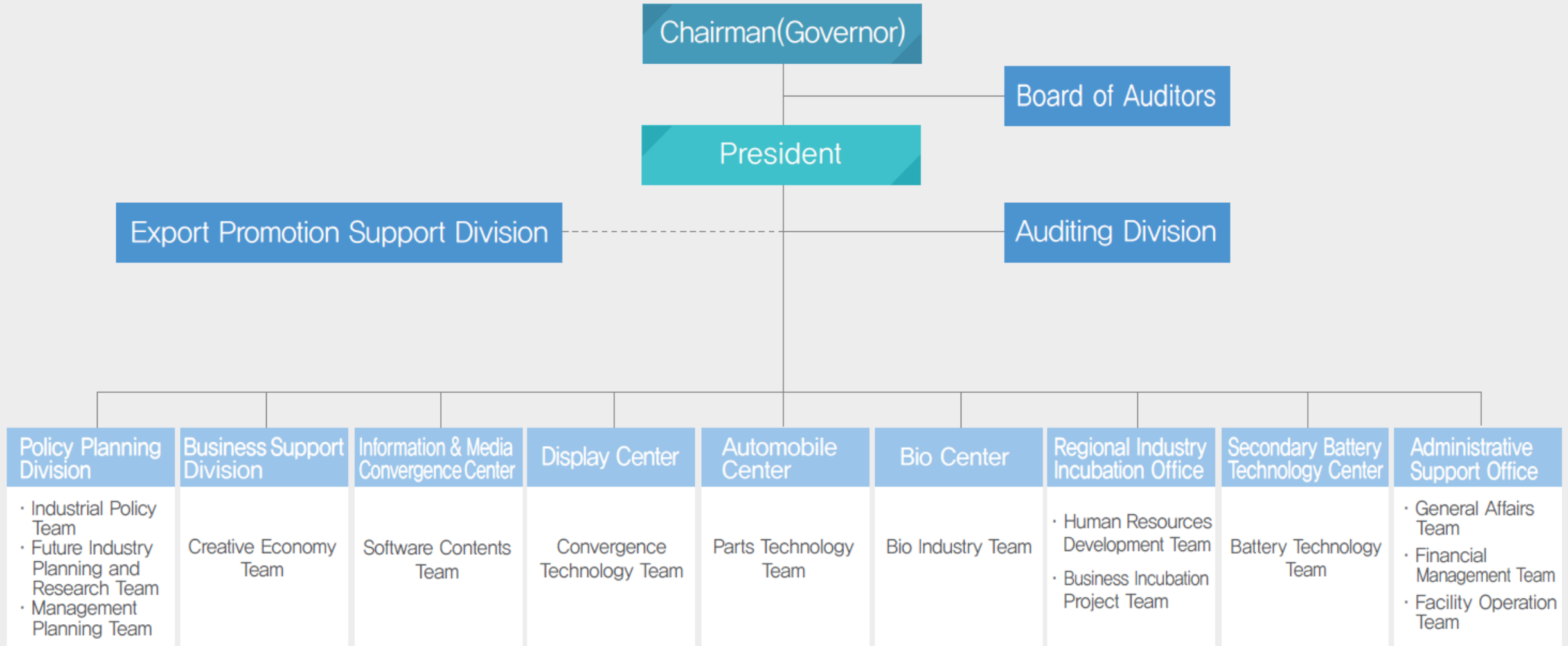
# Geographical location of Chungnam Province

Located in the Midwest of South Korea, guarding the west coast, the Seoul metropolitan area and the central part of the country



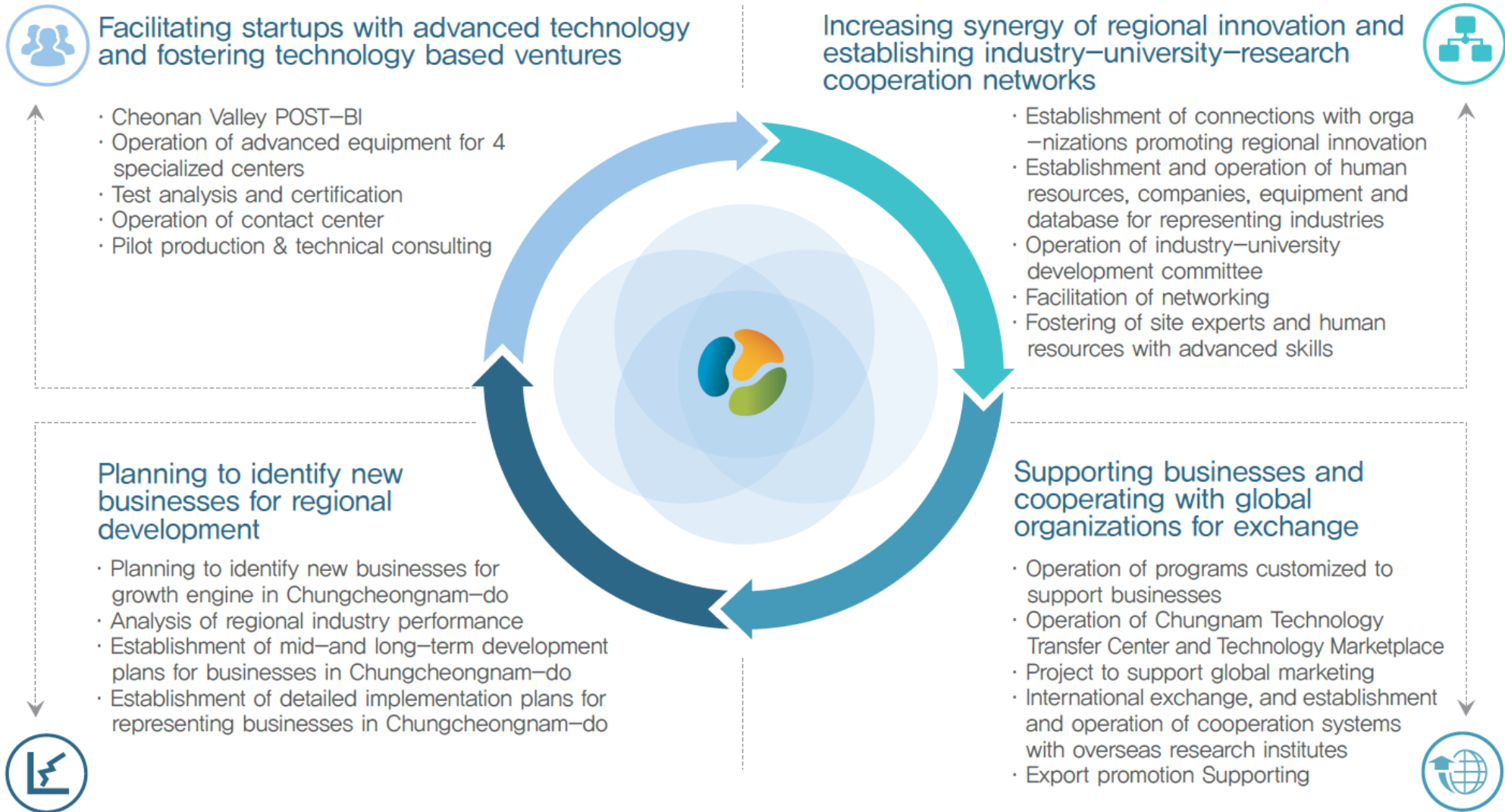
# Introduce of CTP(Chungnam Techno-Park)

## Organizational Structure



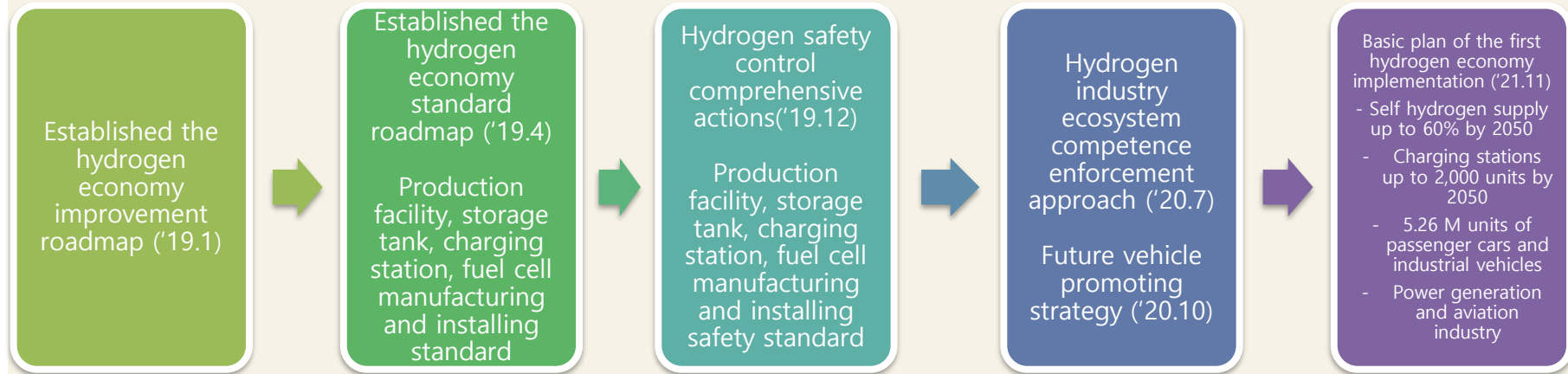
# Introduce of CTP(Chungnam Techno-Park)

## Main Projects

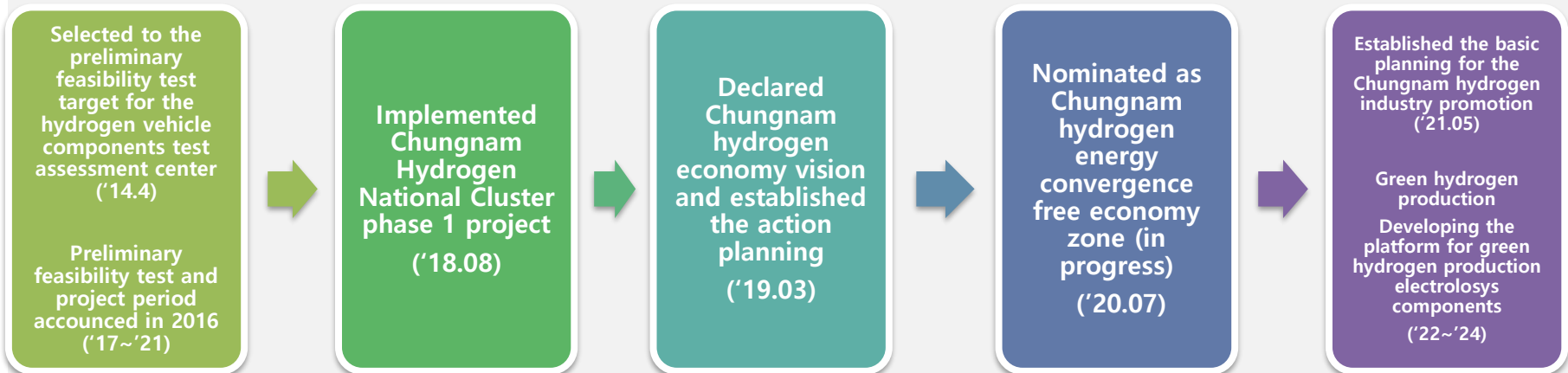


# Hydrogen Industry Fostering Policy

## ● The status of the government's hydrogen industry policy



## ● Chungnam Hydrogen Industry Policy Status



# Status of Korean Hydrogen Policy

## Policy Status

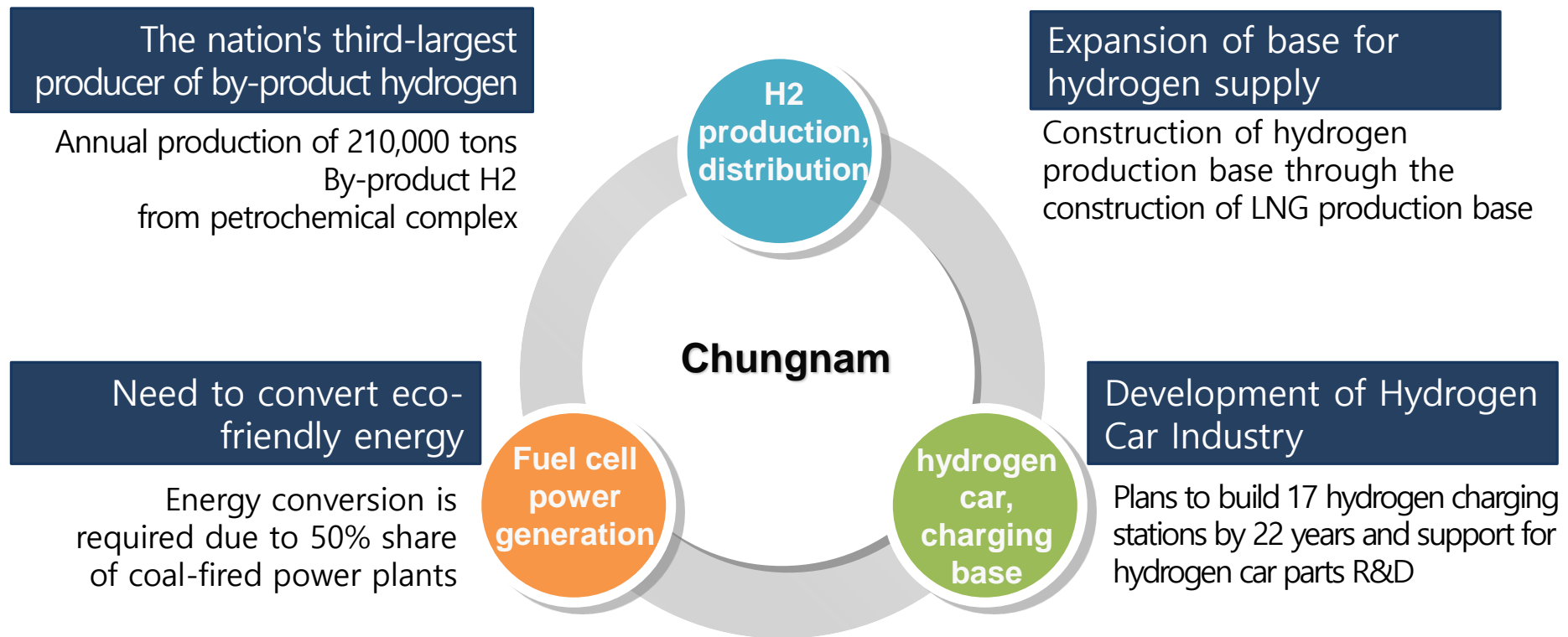


Ministry of Trade, Industry and Energy

# Current Status of Hydrogen Industry in Chungnam

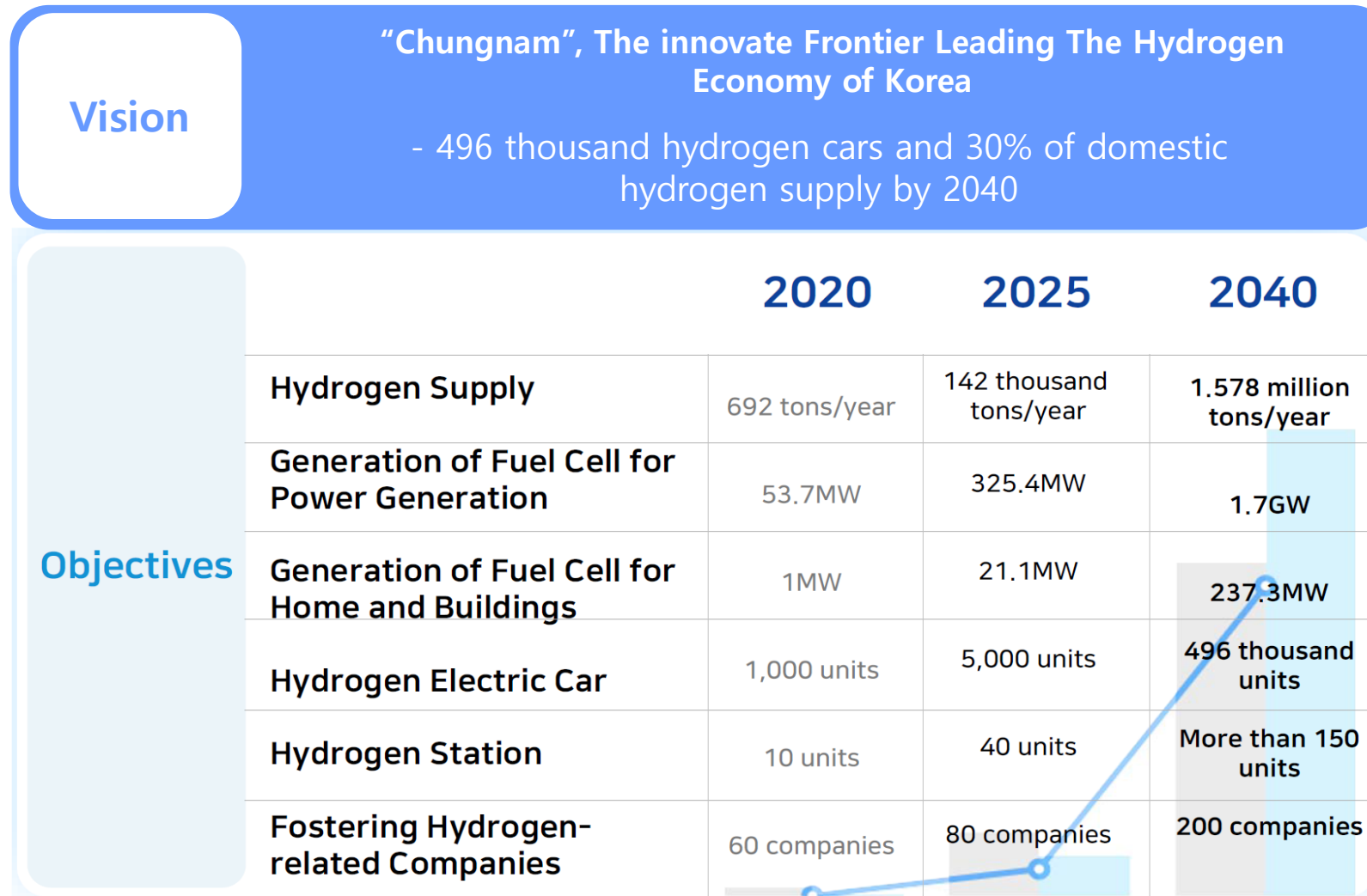
- Promoting the hydrogen industry

## Chungnam is the best location for Green New Deal based on excellent hydrogen infrastructure



# Current Status of Hydrogen Industry in Chungnam

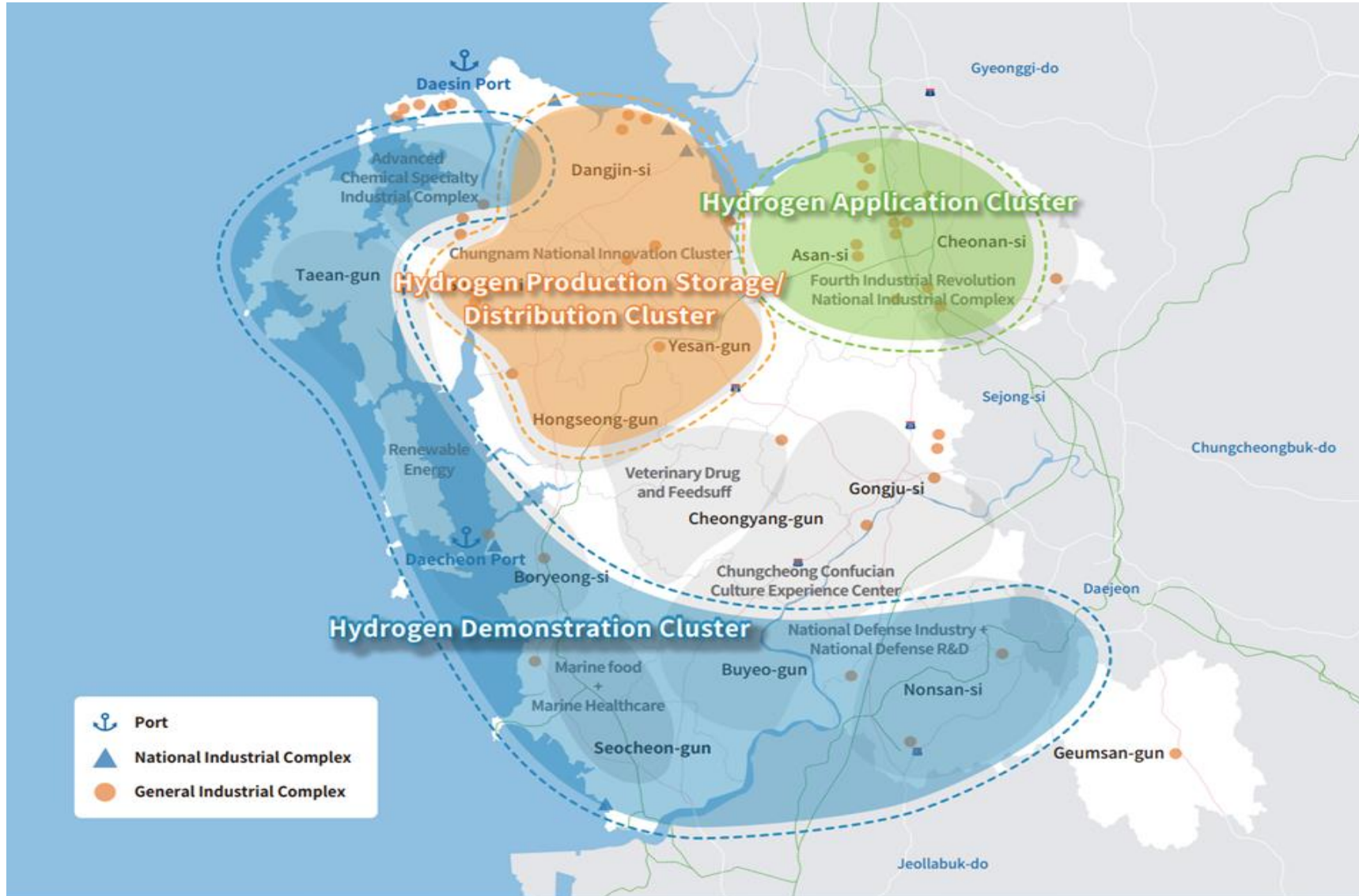
- Vision of Chungnam Hydrogen Economy





# Current Status of Hydrogen Industry in Chungnam

## Geographical Plan for Hydrogen Industry



# Current Status of Hydrogen Industry in Chungnam

- **Started to construct largest LNG production base in Korea (the 5<sup>th</sup> in Korea)**

- Project Period : 2021~2031(will build in sequence)
- Total Investment : KRW3,326.5 billion
- Project Entity : Korea Gas Corporation
- Retained Equipment: 10 units of 200,000 kl class storage tank, vaporizer and transmission equipment, 270,000 kl class LNG carrier docking facility, bunkering facilities etc.
- Expected Benefit: Hydrogen production utilizing BOG (Boil Off Gas), stable hydrogen supply and demand management, hydrogen price reduction, etc.



# Current Status of Hydrogen Industry in Chungnam

## ● Hydrogen Shipping Center

- Project details : Hyundai Steel (in Dangjin) extracts and supplies large amount of hydrogen using byproduct gas.
- Project Entity: Hydrogen energy network Corporation (HyNet) Korea Gas Corporation, Hyundai Motor Company)
- Used for: Fuel for hydrogen vehicles(Volume of Hydrogen gas: 1,700ton/year)
- Transportation: Hyundai Glovis Co.Ltd. (Transport using a hydrogen tube trailer)
- Expected benefit: 20% reduction of hydrogen price (KRW7,500/kg → KRW5,500/kg)



<Hydrogen Production Plant>



pipe



hydrogen supply  
drum  
-pressure: 1.8MPa  
-capacity: 50m<sup>3</sup>



Compressor  
-pressure: Max.  
20MPa  
-capacity: 500N  
m<sup>3</sup>.hr



tube trailer  
-pressure: Max.  
20MPa  
-capacity: 22,900L

<Hydrogen Shipping Center>

# Current Status of Hydrogen Industry in Chungnam

## ● Byproduct Hydrogen Fuel Cell Power Plant

- Project Period: Jul 2018 ~ Jul 2020
- Total Investment: KRW 255 billion
- Project Entity: Daesan Green Energy Co.Ltd. (Special purpose corporation)  
(Hanwha Energy Corporation, Doosan Corporation, Korea East-West Power Co., Ltd)
- Facility capacity: 114 units of 440 kW by-product hydrogen fuel cells  
(50MW/year, Annual production of 400,000 MWh)
- Expected Benefit: The first and largest by-product fuel cell power plant in the world



# Current Status of Hydrogen Industry in Chungnam

## • Distribution Hydrogen Stations and Cars



- Supplied hydrogen cars in Chungnam area: 650 units. (as of Jul 2021)
  - Passenger car 637 units, Bus 13 units
- Hydrogen vehicle distribution target for 2021 : 312 units
  - 300 units of passenger car, 12 units of bus
  - Cheonan 112 units, Asan 82 units, Seosan and Dangjin 35 units each, other reason 48 units etc.



- Supply of Hydrogen fueling stations in Chungnam area : 11 units (as of Dec 2021)
  - Public : Naepo, Asan, Dangjin, Seosan (+under construction in Cheonan, Boryeong)
  - Private : Asan, Cheonan (2), Dangjin, under construction in Boryeong
- Hydrogen fueling station distribution target for 2025 : 22 units
- Hydrogen fueling station distribution target for 2030 : 33 units

# Current Status of Hydrogen Industry in Chungnam

## ● Chungnam Hydrogen Fuel Cell Automotive Parts Test and Evaluation Center

- Project Period: 2017~2021(5 years)
- Total Investment: KRW70.8 billion (Government expenditure KRW34.9 billion, Regional government expenditure KRW21.2 billion, Private investment KRW14.7 billion)
- Project Entity: Chungnam Techno Park Automobile Center
- Project details: Automotive center building & equipment construction, Businesses support (prototype production, manpower training, auto parts technology development etc.)
- Construction Equipment: Durability and performance evaluation equipment, Parts and vehicle demonstration (Fuel cell stack evaluation under complex environment, 10kW fuel cell performance evaluation equipment etc.)



# Current Status of Hydrogen Industry in Chungnam

## The project to establish the supporting network for green hydrogen water electrolysis components development



### Project period

2022. 04. 01 ~ 2024. 12. 31  
(33 months)



### Budget

A total of **KRW 12.5 B**  
(National grants KRW 5,98 B,  
Local government fund KRW 6,45 B,  
Private funding KRW 84 M)



### Lead Institution

**Organize**▶ Chungnam Techno Park

**Participate**◀ KITECH,  
KIST, Hoseo Industry-University  
Institute Collaboration

### Establish the infrastructure

Prepared space only for equipment installation and project operation is guaranteed

(Center location : Free lease of 6,600m<sup>2</sup> area and 825m<sup>2</sup> construction site in the Seokmun National Industrial Complex in Dangjin, Chungnam)



### Install and operate the equipment

11 types 13 units of new equipment installed (by the request from the demand analysis from the companies)

Equipment performance improvement for 3 types 3 units of the equipment

Prototyping with the installed equipment and operating the equipment for reliability



### Technical support and experts' training

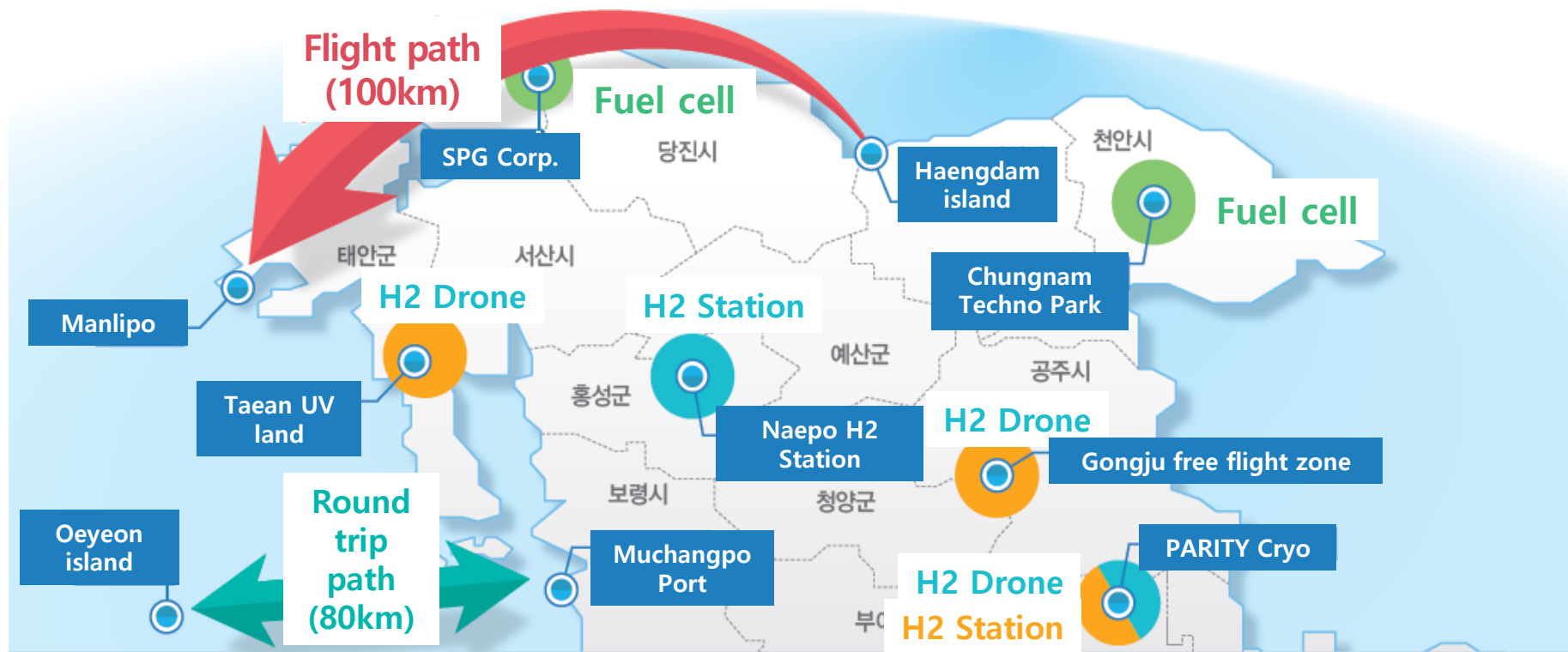
Training experts for the site with operating the installed equipment, such as analyze failure causes, technical skill training, prototype consulting, project support and operation training for the installed equipment



# Current Status of Hydrogen Industry in Chungnam

## Special Free Zone for Hydrogen Energy Conversion

- 2020. 7 ~ 2024. 6 (48 months), Investing 22.8 billion won
- Demonstration of hydrogen fuel cell power generation system for buildings
- Demonstration of hydrogen charging system
- Demonstration of hydrogen-drone long-range flight





# Current Status of Hydrogen Industry in Chungnam

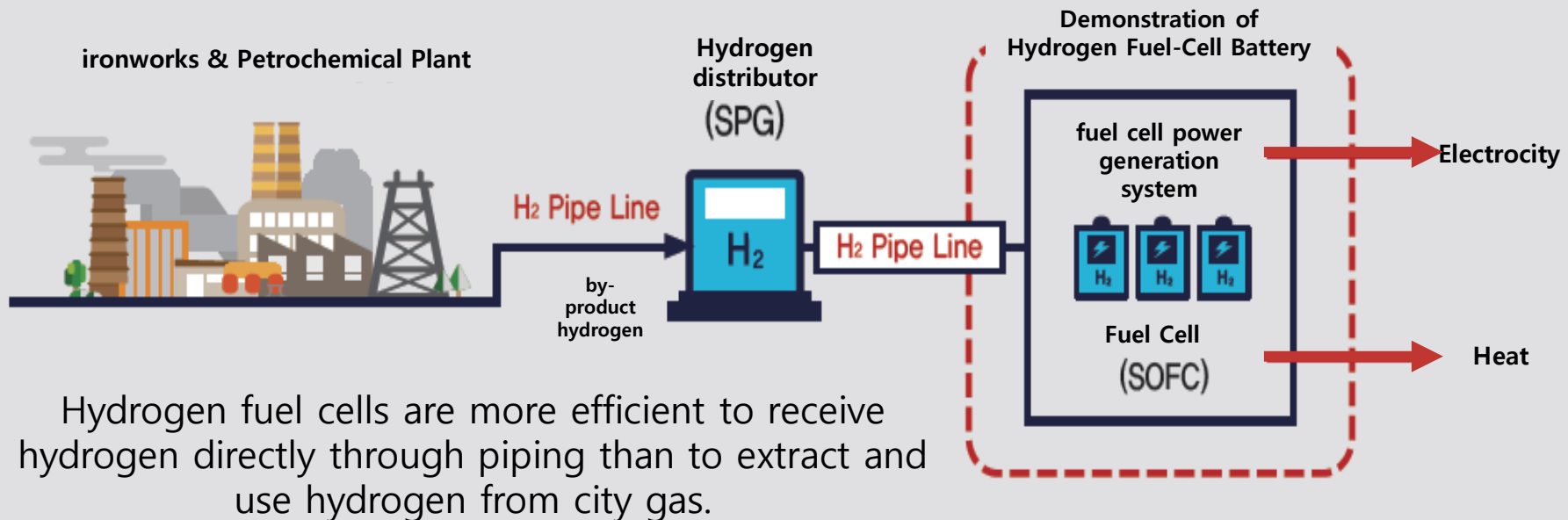
## ● Hydrogen Energy Conversion Regulatory Free Zone : Demonstration of direct hydrogen fuel cell (SOFC) system.

### Current Regulation

- Currently, only reformed fuel cells that generate power by extracting hydrogen from city gas are permitted.
- There are no regulations for the direct hydrogen supply type fuel cell

### Details of request for regulatory exceptions

- Allow demonstration for safety verification such as long-term testing of direct hydrogen fuel cells



# Current Status of Hydrogen Industry in Chungnam

## ● Hydrogen Energy Conversion Regulatory Free Zone

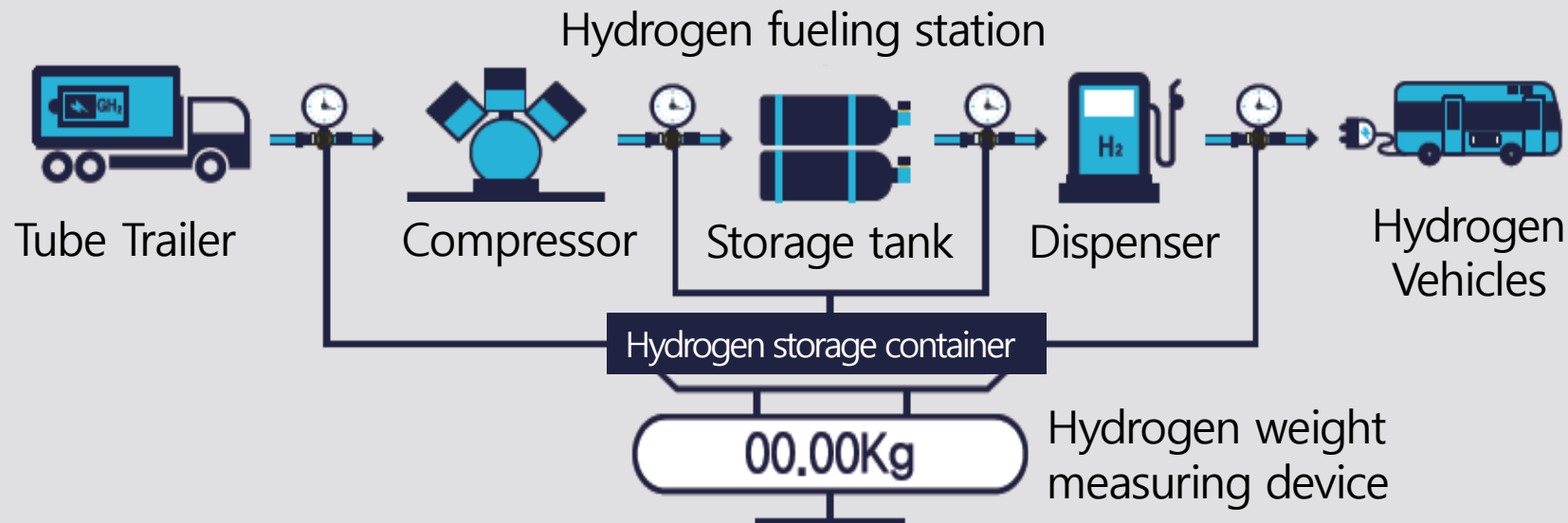
: Demonstration of parts for hydrogen fueling station and of inspection equipment

### Current Regulation

- At hydrogen fueling stations, only hydrogen-electric vehicles can be charged, and the test devices for measuring the filling quantity can not refill hydrogen.

### Details of request for regulatory exceptions

- A test device for measuring the filling quantity is allowed to refill hydrogen at hydrogen fueling stations.



# Current Status of Hydrogen Industry in Chungnam

## ● Hydrogen Energy Conversion Regulatory Free Zone

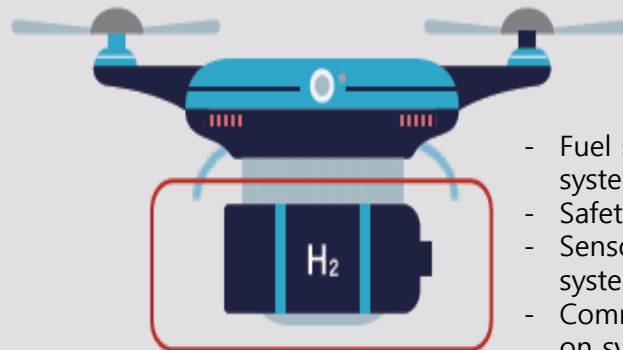
: Demonstration of parts for hydrogen fueling station and of inspection equipment

### Current Regulation

- Lack of standards for manufacturing, technology, and re-inspection of liquid hydrogen fuel cell power system (power pack) and fuel tank for drones

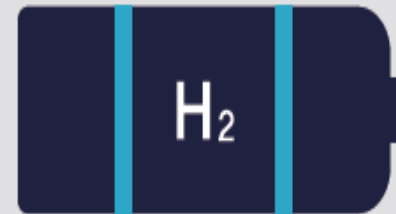
### Details of request for regulatory exceptions

- Demonstration of liquid hydrogen power pack technology and safety standards.
- Demonstration to prepare performance test and safety inspection standards for liquid hydrogen fuel tanks for drones.



Liquid hydrogen drone power pack

- Fuel supply system
- Safety system
- Sensor system
- Communication system

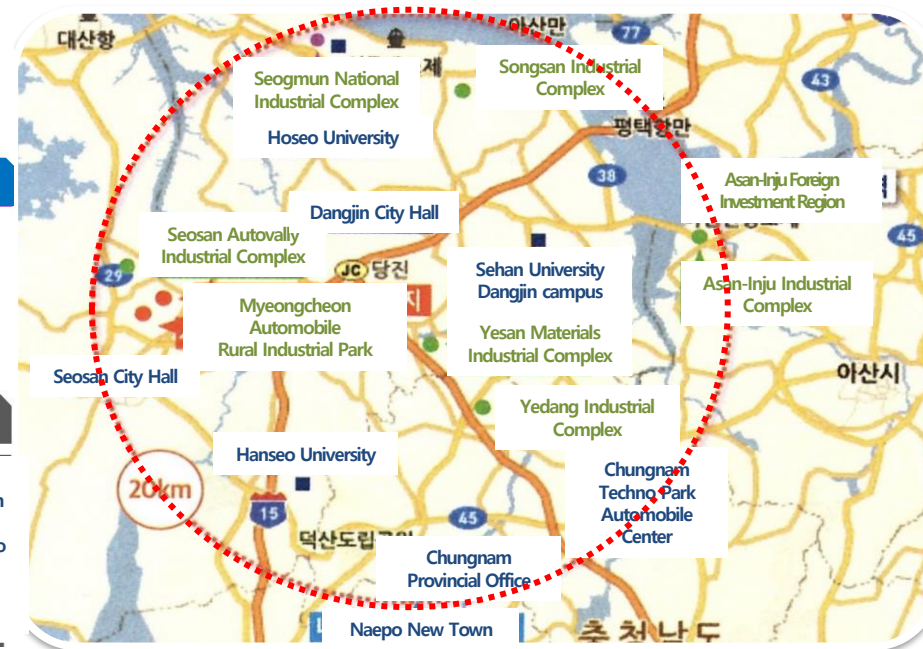
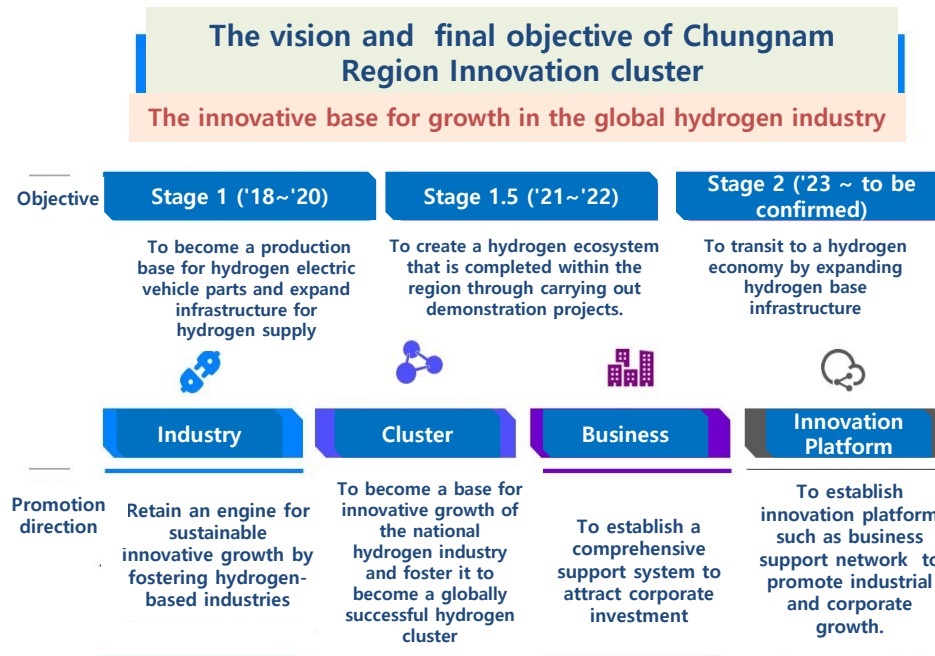


Liquid hydrogen fuel tank container

# Current Status of Hydrogen Industry in Chungnam

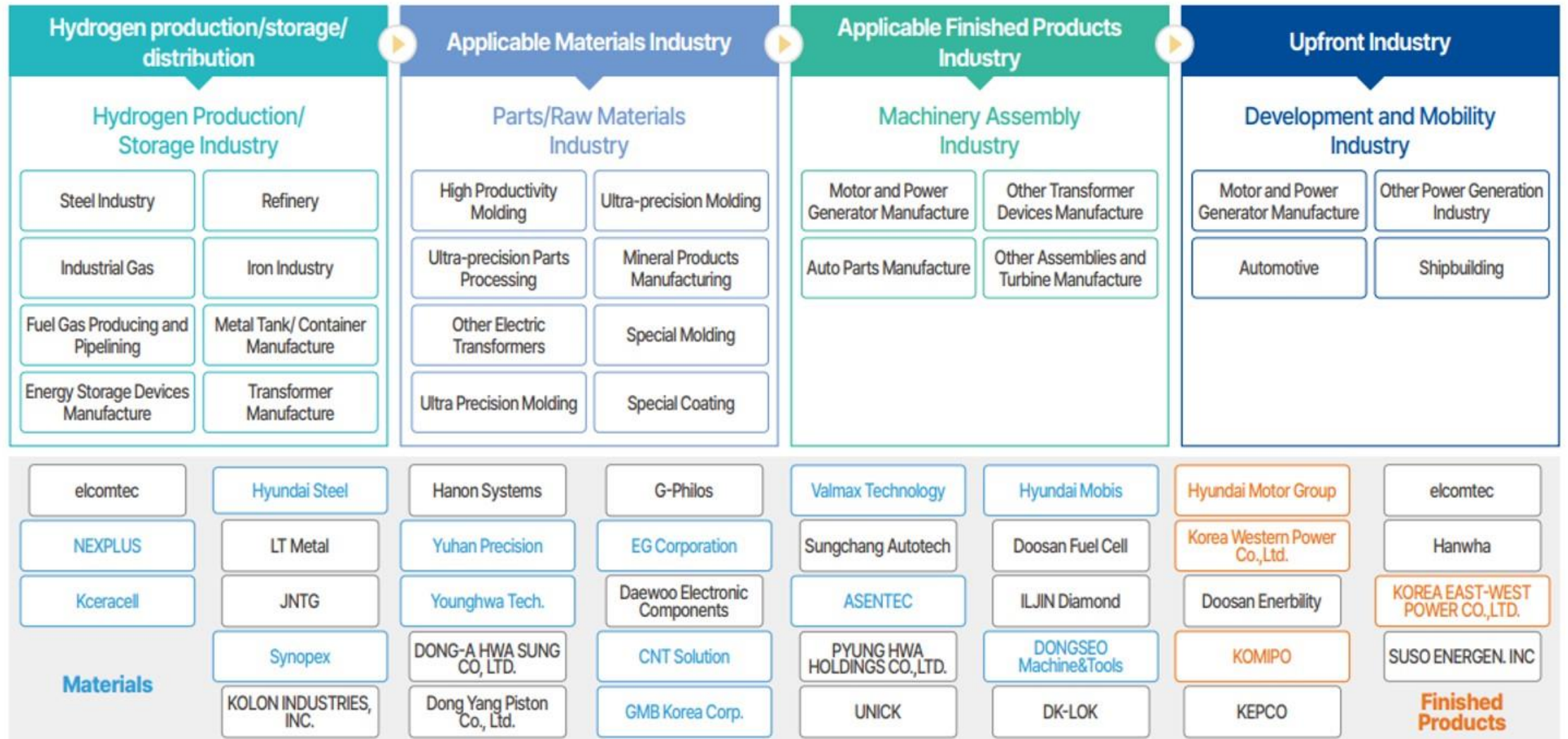
## ● Chungnam National Innovation Cluster Promotion Project

- Project Period : Jul 2018 ~ Dec 2022 (5 years, stage 1 ~ stage 1.5)
- Total Investment : KRW25.1 billion
- Project Entity : Chungnam Techno Park, Korea Automotive Technology Institute
- Project Details : Establishing hydrogen industry promotion plan in Chungnam Area, carrying out R&D for Hydrogen vehicle parts, providing business support to promote hydrogen industry.
- Future Plan : Establishing Stage 2 National Innovation Cluster Promotion Project



# Current Status of Hydrogen Industry in Chungnam

## Hydrogen Industry Value Chain



# Current Status of Hydrogen Industry in Chungnam

## 1ST R&D PROJECT

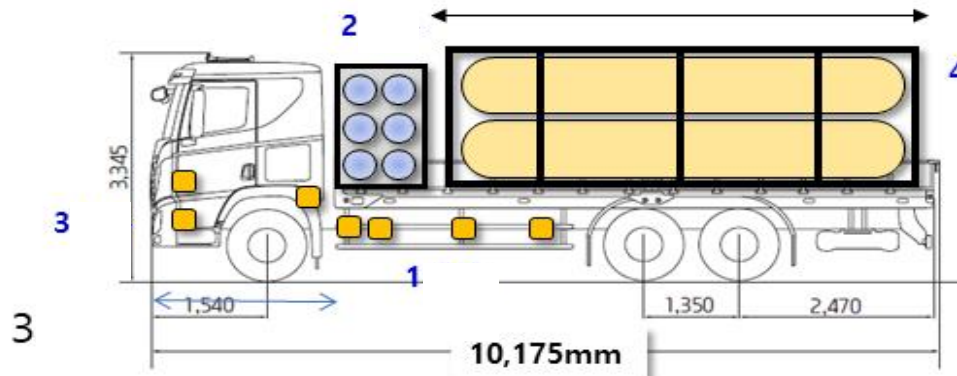
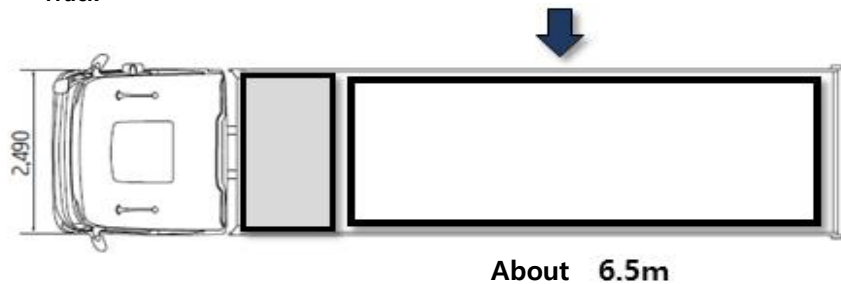
### Part technology development(Part mounting)



HMC Hydrogen Truck concept



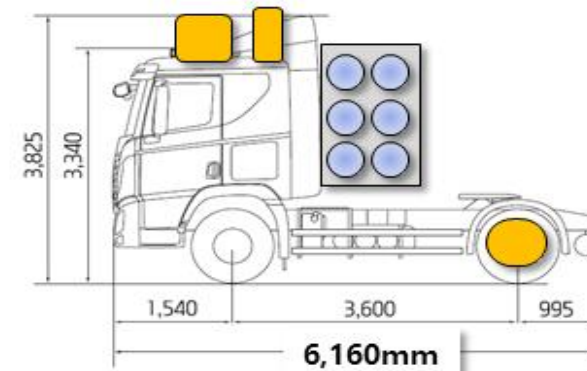
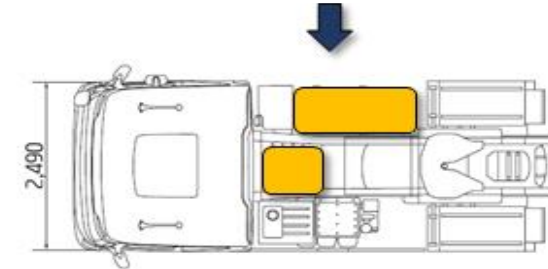
Accent 4x2 cargo



### Modification technology development(Design, Analysis)



4x2 Tractor (High Roof Cab)

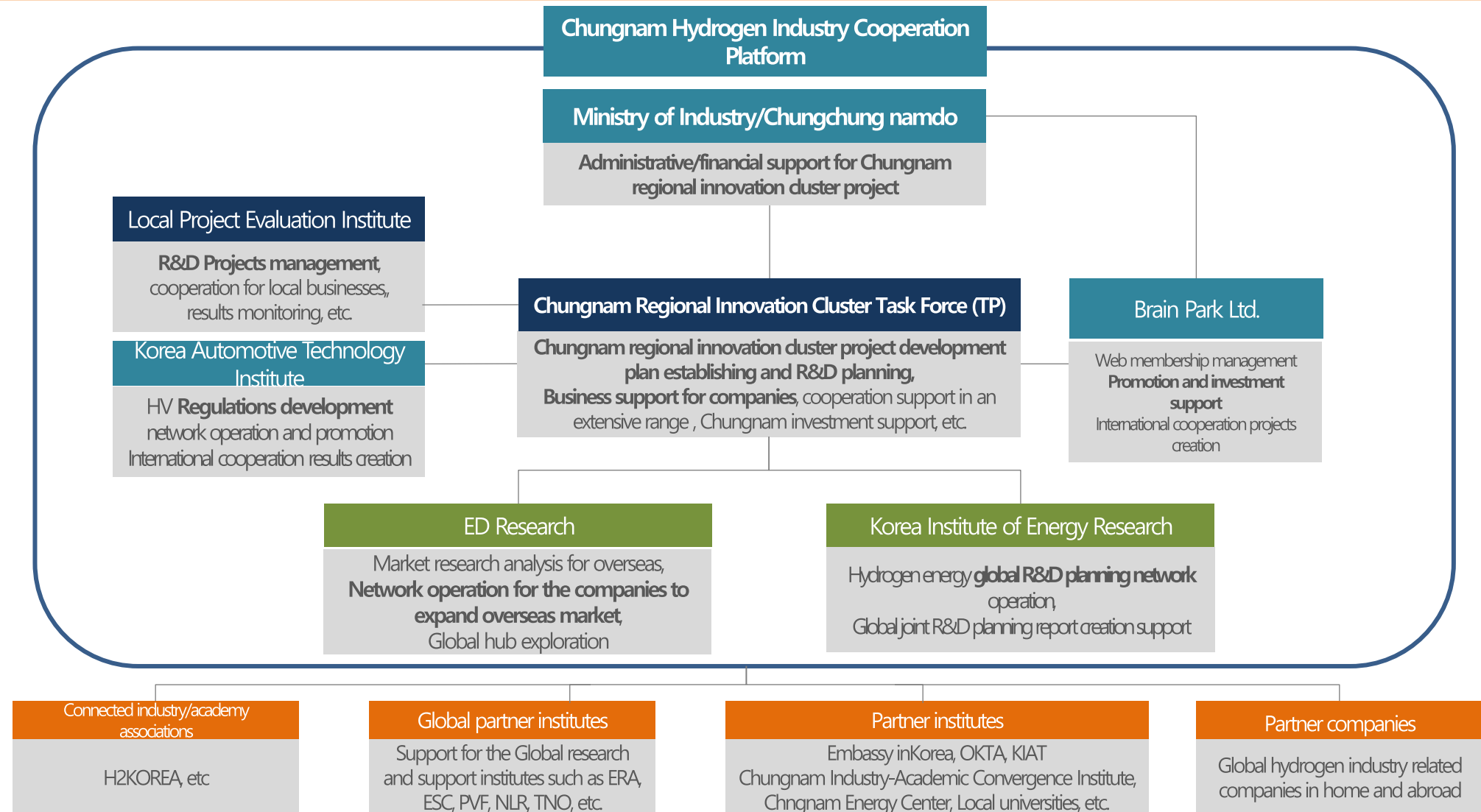


# Support Non-R&D Project

Type	Business Projects	Business Objectives
Network	<b>Investment Promotion</b>	Promote investment in national innovation clusters in private sector
	<b>Investment Support</b>	Promotion to select and attract core companies/institutions
	<b>Network Operation</b>	Network operation for companies to penetrate overseas market and business unit cooperation
	<b>Regulation Improvement</b>	Addressing the problems during the business project promotional process or defining the requirements for regulatory improvement
	<b>Development Plan</b>	Establishing development plans to promote the 2nd phase business project for local innovation cluster
Global Partnership	<b>Discovering New Bases</b>	Establishing overseas bases to support companies' overseas market penetration
	<b>Creating Collaborative Achievement</b>	Creating achievements through collaborative networks with existing overseas bases
	<b>Market Research/Analysis</b>	Analysis on current technology research, market research, entry strategy, etc. for companies' overseas market penetration
Business Support	<b>Development Capacity Enhancing Support</b>	Supporting companies in the cluster to develop new technologies and create business proposals for government projects
	<b>Business Support</b>	Customized business support such as prototyping, promotion, etc. for the companies in the cluster
Basic Program	<b>Business Promotion and Performance Report</b>	Business promotion and performance report to attract engagement of national innovation cluster project for other companies and institutions
	<b>Exhibition Support</b>	Supporting domestic, foreign, virtual and in-person exhibitions to find the opportunities for overseas market and potential domestic partners
	<b>Global R&amp;D Development</b>	Developing potential partnerships and supporting business proposals for companies to penetrate in the overseas market and protect their intellectual property rights
Optional Program	<b>Supporting value-added hydrogen products</b>	Commercializing convergence products and supporting advancement of hydrogen products to expand hydrogen industry

# Support Non R&D Project

## Market and Global Cooperation





# Direction for International Cooperation of National Innovation Cluster



**Establishing one of the best international cooperation hub related to the hydrogen industry for SMEs in Korea**

# Thank you for your attention

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