

# Toyota's Initiatives for the Realization of a Hydrogen-based Society

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## Government of Japan

June 11, 2019

**“A long-term strategy as a growth strategy based on the Paris Agreement” Cabinet decision**

Specification of the realization of a hydrogen-based society and the use of CO<sub>2</sub>-free hydrogen as the government’s vision

## Governments of Japan , the United States , and Europe

June 15, 2019

**Announcement of a Japan-U.S.-Europe joint declaration related to hydrogen and fuel cell technologies**

This is the first time for the governments of Japan, the United States and Europe to create a framework for cooperation on hydrogen.

# TOYOTA ENVIRONMENTAL CHALLENGE 2050



- Number of units produced

To 2015:      Approx. 700 units a year



From 2017:    Approx. 3,000 units a year

- Verification track record

Since 2016:    Australia

Since 2017:    Canada, UAE, and China



Mirai

## FC forklifts

Approx. 160 units introduced

Motomachi Plant	72	➔	Expansion to 170–180 units by around 2020
Kansai International Airport	7		
Keihin Coastal Area	12		
Chubu International Airport	7		
Australia	2		



Toyota Industries Corporation

## FC buses

19 units introduced

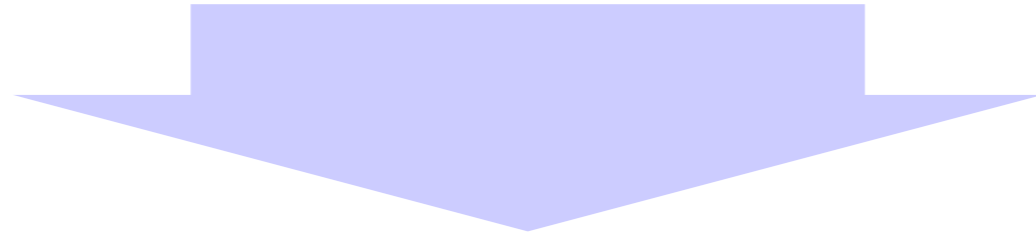
Tokyo Metropolitan Government	15
Toyota City	3
Keihin Kyuko Bus Co., Ltd.	1



Sora

Introduction of more than 100 units planned for the Olympic and Paralympic Games Tokyo 2020

## Slow expansion of a hydrogen-based society

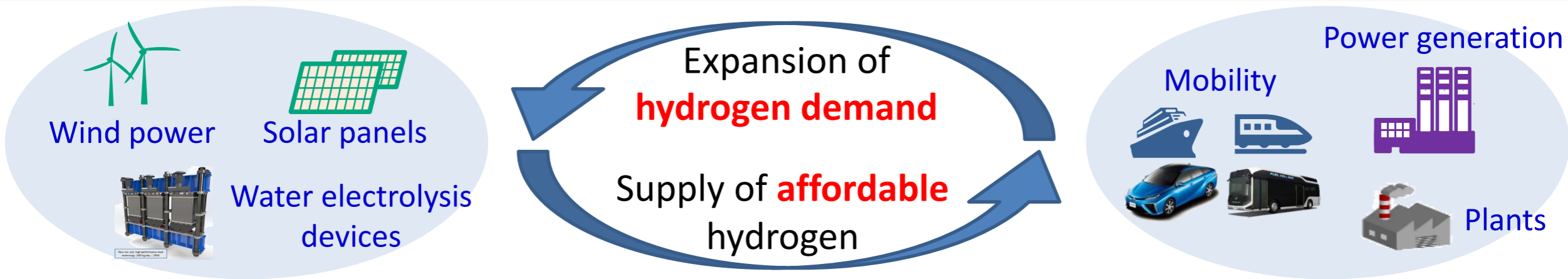


Hydrogen and hydrogen-related costs  
“Produce” “Transport” “Use”

Hydrogen-related regulations

Social acceptability

**It is important to resolve these issues.**



## Supply side

## Demand side

- Reduction of equipment costs
- Improvement of operation rates
- Optimization of transport methods

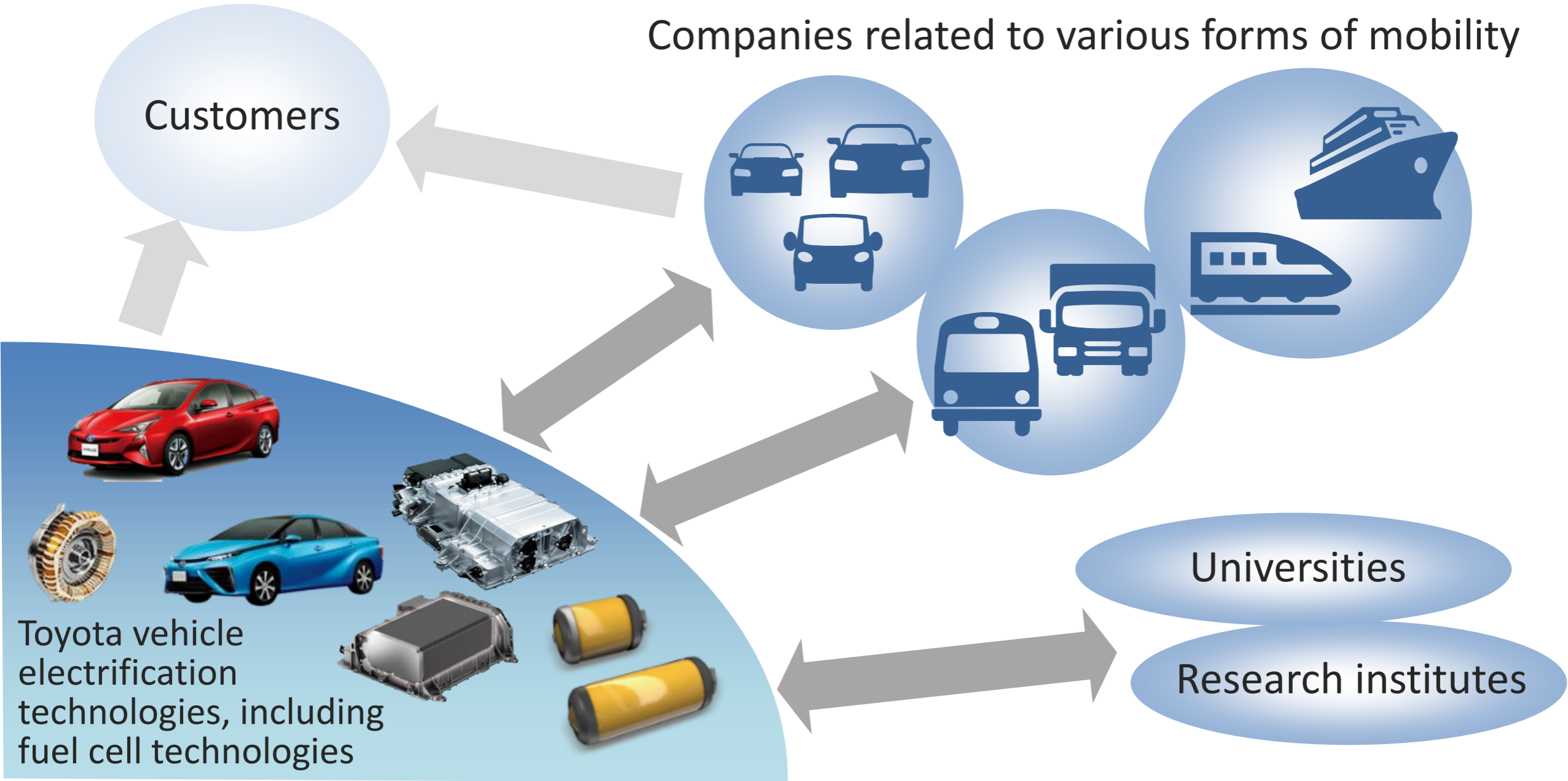
- Development of hydrogen power generation technologies
- Reduction of FC system costs
- Expansion of FC mobility
- Expansion of use at plants

## Government

**TOYOTA**

- Acceleration of regulation revisions
- Incentives, tax benefits
- Enactment of regulations related to CO<sub>2</sub> reduction in other sectors


To accelerate the realization of a hydrogen-based society, industry and government must work together to create a favorable environment for hydrogen demand.






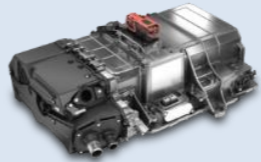

**Granting royalty-free licenses on approximately 23,740 patents for vehicle electrification-related technologies**  
(Until the end of 2030)

(The numbers of patents are approximate numbers as of the end of March 2019)

**Electric motors**  
2,590 patents 


**Power control units**  
2,020 patents 



**System control 4,540 patents**

 +  → **FCEVs**


**FC stacks 2,840 patents**      **Hydrogen tanks 680 patents**

**System control 7,550 patents**

 → **BEVs**

 +  → **PHEVs**

**Chargers 2,200 patents**

 → **HEVs**

**Engines and transaxles 1,320 patents**

## FC trucks

### Small trucks

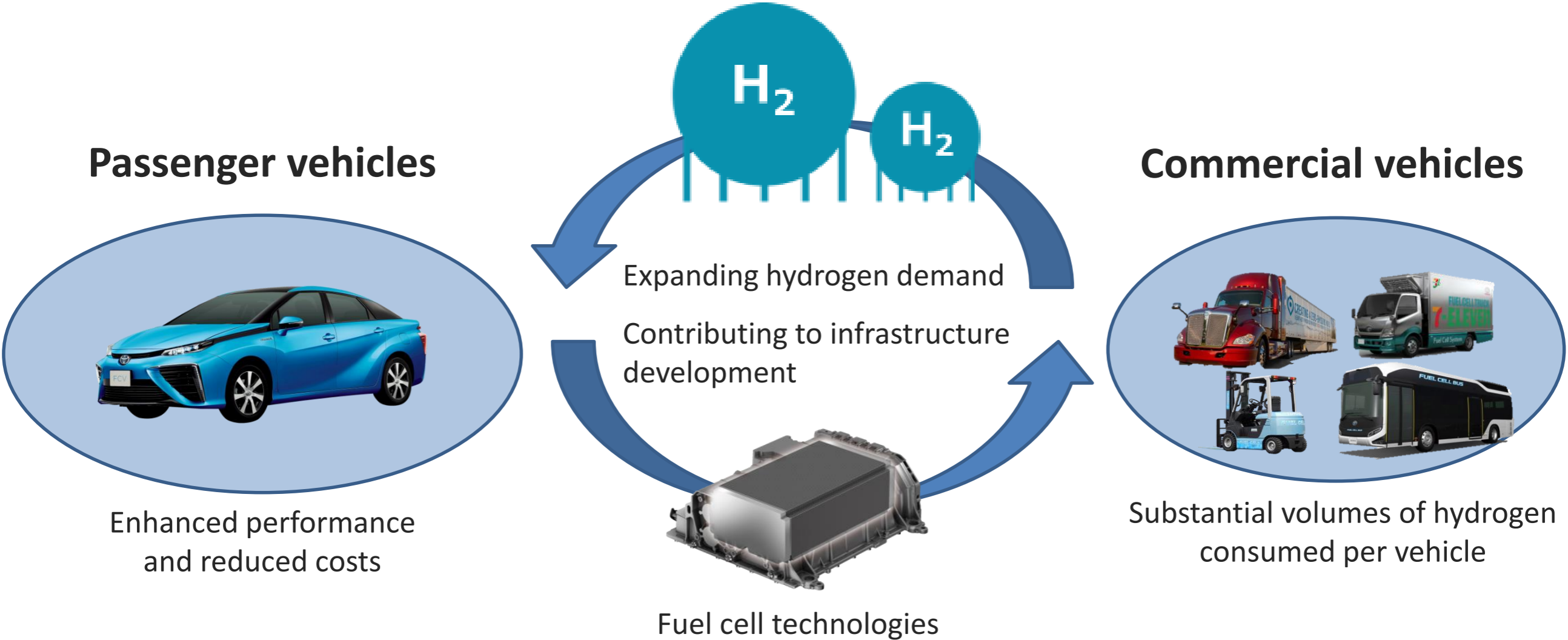


Ongoing verification tests  
by Seven-Eleven Japan and Toyota

### Large trucks

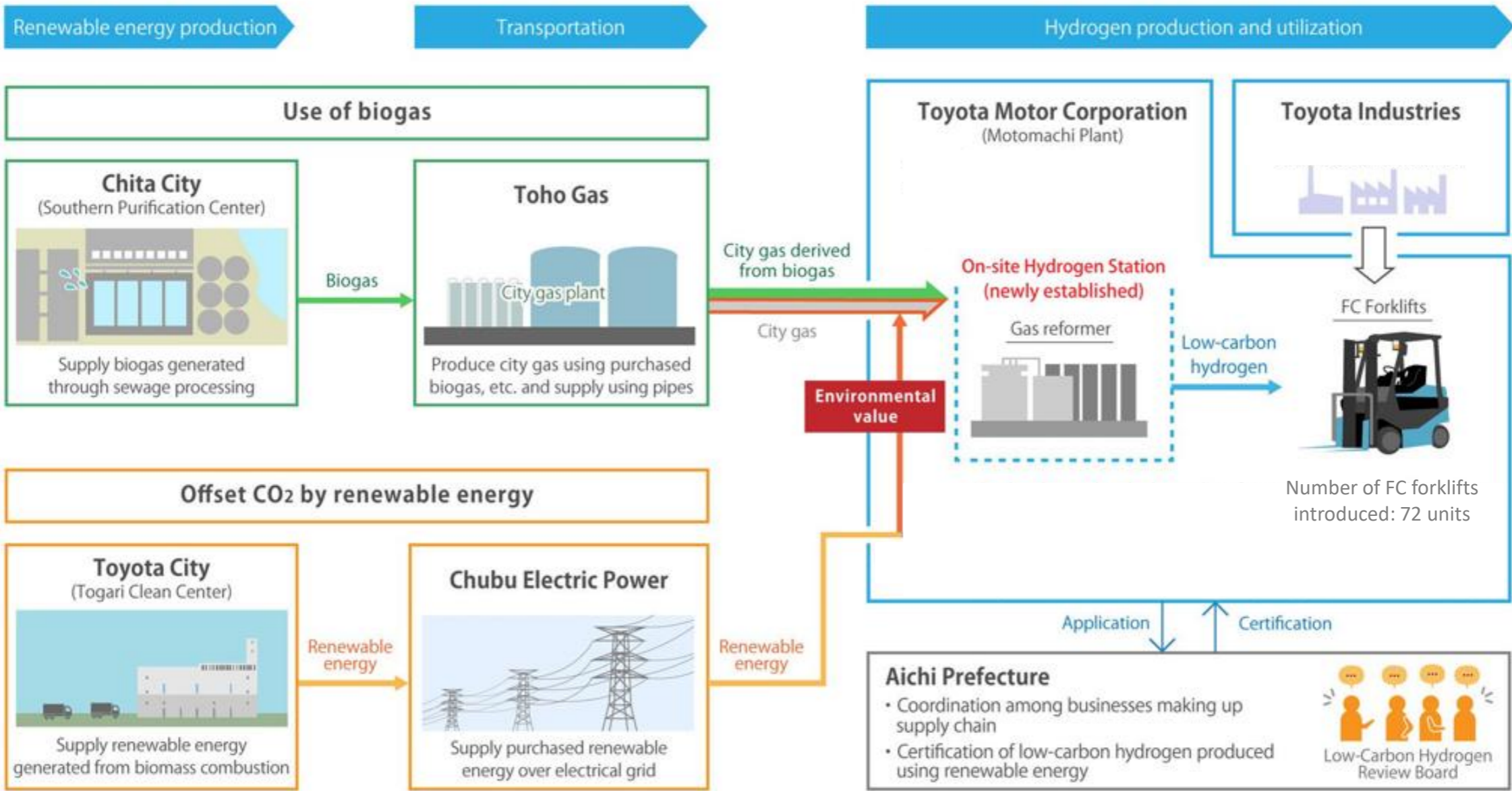


Ongoing verification tests at the  
Port of Los Angeles in the United States



**Expanding hydrogen demand through the synergistic effect of the widespread use of FCEV passenger vehicles and the introduction of FCEV commercial vehicles**

## Chita City and Toyota City Renewable Energy-use Low-carbon Hydrogen Project



# Motomachi Plant: Production and Use of Hydrogen Derived from Renewable Energy 13

Solar power generation at the plant site



Small, water electrolysis-based machine for hydrogen generation and fueling

Simple Fuel™



Electricity from renewable energy

FC forklift refueling



Hydrogen production capacity:  
Max. 99 Nm<sup>3</sup>/day  
(Approx. 8.8 kg/day)

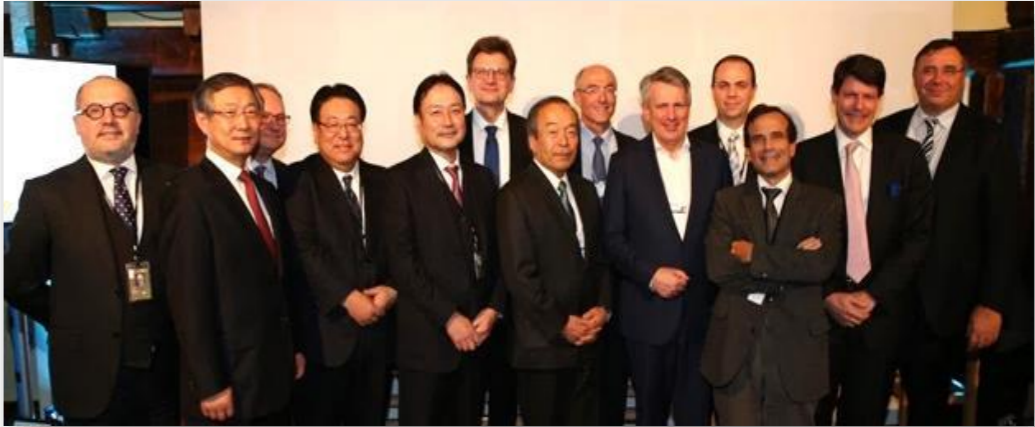
H<sub>2</sub>

Can refuel 7–8 units/day

## Steering members: 34 companies



Established on January 18, 2017



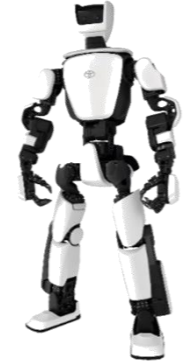
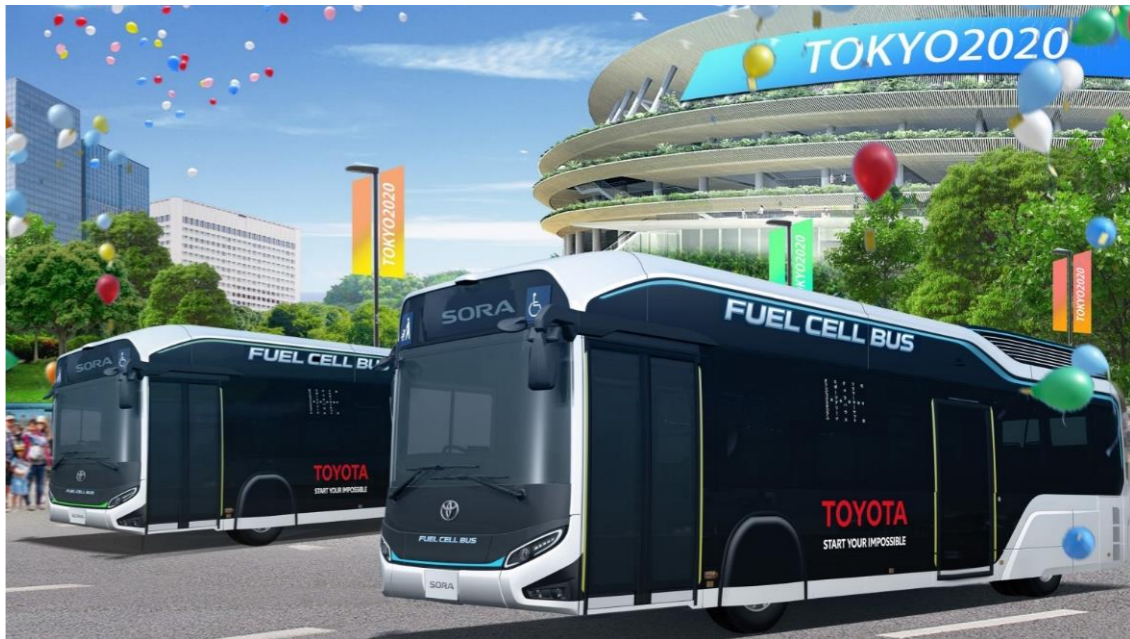
## Supporting members: 26 companies

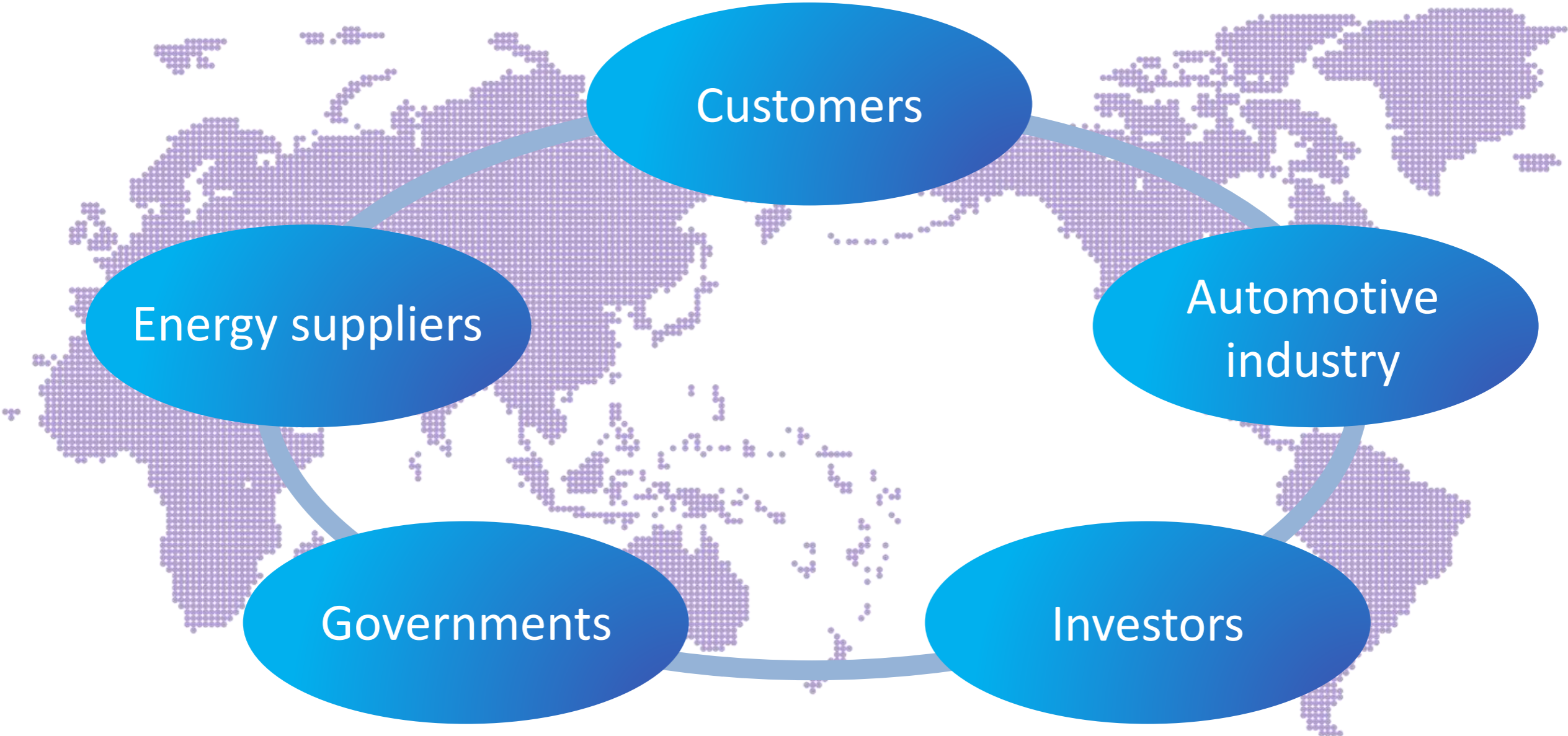


**World's first CEO-level global initiative  
for the realization of a hydrogen-based society**



**MOBILITY FOR ALL**







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