



INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

IPHE Country Update April 2019: Japan

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1. New Initiatives, Programs, and Policies on Hydrogen and Fuel Cells

The Strategic Road Map for Hydrogen and Fuel Cells was released March 12, 2019. In order to achieve goals set in the Basic Hydrogen Strategy, Japan set new targets and decided to establish an Expert Committee to evaluate and conduct follow-up for each field.

The Strategic Road Map for Hydrogen and Fuel Cells (Plan) ~Action plan of industry-academic-government for realization of Hydrogen Society~ (overall)

- In order to achieve goal settled in Basic Hydrogen Strategy,
- ① **Set of new targets to achieve (Spec of basic technologies and goals of beakedowned cost), establish approach to achieve**
- ② **Establish committee to evaluate by experts and conduct follow-up for each field.**

	Goals in Basic Hydrogen Strategy	Set of targets to achieve	Approach to target achievement							
Use	Mobility	FCV 200k@2025 800k@2030	2025 <ul style="list-style-type: none"> • Price difference between FCV and HV (¥3m → ¥0.7m) • Cost of main FCV system <table border="0"> <tr> <td>FC</td> <td>¥20k/kW → ¥5k/kW</td> </tr> <tr> <td>Hydrogen Storage</td> <td>¥0.7m → ¥0.3m</td> </tr> </table> 	FC	¥20k/kW → ¥5k/kW	Hydrogen Storage	¥0.7m → ¥0.3m	<ul style="list-style-type: none"> • Regulatory reform and developing technology 		
		FC	¥20k/kW → ¥5k/kW							
		Hydrogen Storage	¥0.7m → ¥0.3m							
	HRS 320@2025	2025 <ul style="list-style-type: none"> • Construction and operating costs <table border="0"> <tr> <td>Construction cost</td> <td>¥350m → ¥200m</td> </tr> <tr> <td>Operating cost</td> <td>¥34m → ¥15m</td> </tr> </table> • Costs of components for HRS <table border="0"> <tr> <td>Compressor</td> <td>¥90m → ¥50m</td> </tr> <tr> <td>Accumulator</td> <td>¥50m → ¥10m</td> </tr> </table> 	Construction cost	¥350m → ¥200m	Operating cost	¥34m → ¥15m	Compressor	¥90m → ¥50m	Accumulator	¥50m → ¥10m
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Accumulator	¥50m → ¥10m									
Bus 1,200@2030	Early 2020s <ul style="list-style-type: none"> • Vehicle cost of FC bus (¥150m → ¥52.5m) 	<ul style="list-style-type: none"> • Expanding HRS for FC bus 								
		※In addition, promote development of guidelines and technology development for expansion of hydrogen use in the field of FC trucks, ships and train.								
	Power	Commercialize @2030	2020 <ul style="list-style-type: none"> • Efficiency of hydrogen power generation (26%→27%) ※1MW scale 	<ul style="list-style-type: none"> • Developing of high efficiency combustor etc. 						
	FC	Early realization of grid parity	2025 <ul style="list-style-type: none"> • Realization of grid parity of Commercial and industrial use 	<ul style="list-style-type: none"> • Developing technology of FC cell/stack 						
Supply	Fossil Fuel + CCS	Hydrogen Cost ¥30/Nm3@2030 ¥20/Nm3@future	Early 2020s <ul style="list-style-type: none"> • Production: Production cost from brown coal gasification (¥several hundreds/Nm3 → ¥12/Nm3) • Storage/Transport : Scale-up of Liquefied hydrogen tank (thousands m³→50km³) Higher efficiency of Liquefaction (13.6kWh/kg→6kWh/kg) 	<ul style="list-style-type: none"> • Scaling-up and improving efficiency of brown coal gasifier • Scaling-up and improving thermal insulation properties 						
	Green H2	System cost of water electrolysis ¥50,000/kW @future	2030 <ul style="list-style-type: none"> • Cost of electrolyzer (¥2m/kW→0.5m/kW) • Efficiency of water electrolysis (5kWh/Nm3→4.3kWh/Nm3) 	<ul style="list-style-type: none"> • Demonstration in model regions for social deployment utilizing the achievement in the demonstration of Namie, Fukushima • Development of electrolyzers with higher efficiency and durability 						

2. Hydrogen and Fuel Cell R&D Update

Nothing new to report in this period.

3. Demonstration, Deployments, and Workforce Developments Update

Nothing new to report in this period.



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4. Events and Solicitations

Hydrogen Energy Ministerial Meeting 2019 is scheduled for September 25th in Tokyo. (tentative)

5. Investments: Government and Collaborative Hydrogen and Fuel Cell Funding

METI decided its Hydrogen and Fuel Cell Budget for FY2019 is JPY 60.2Billion.

6. Regulations, Codes & Standards, and Safety Update

Nothing new to report in this period.



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Summary Country Update April 2019: Japan

Transportation	Target Number	Current Status	Partnerships, Strategic Approach	Support Mechanism
Fuel Cell Vehicles ¹	40,000 by 2020 200,000 by 2025 800,000 by 2030	3,026 As of March 2019	-	• Subsidy for purchase (national and local government initiative)
FC Bus	100 by 2020 1,200 by 2030	18 As of March 2019	-	• Subsidy for purchase (national and local government initiative)
Fuel Cell Trucks ²	No target	-	-	• Subsidy for R&D, demonstration (national government initiative)
Forklifts	500 by 2020 10,000 by 2030	160 As of March 2019	-	• Subsidy for R&D, demonstration (national government initiative) • Subsidy for purchase (national government initiative)
H ₂ Refueling Stations	Target Number	Current Status	Partnerships, Strategic Approach	Support Mechanism
70 MPa On-Site Production	160 by 2020 900 by 2030	17 operational As of March 2019 (2 in progress)	• Initially focusing on four major metropolitan areas	• Subsidy for CAPEX/OPEX(national government and partially local government initiative)

¹ Includes Fuel Cell Electric Vehicles with Range Extenders

² As above



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70 MPa Delivered		86 operational As of March 2019 (8 in progress)	<ul style="list-style-type: none"> Establishing Japan H2 mobility LLC, (JHyM) for development of a hydrogen station network Regulatory reform of HRC 	
35 MPa On-Site Production		24 operational As of November 2018	<ul style="list-style-type: none"> Municipality lead instruction as official vehicles 	
35 MPa Delivered		—		
Stationary	Target Number ³	Current Status	Partnerships, Strategic Approach	Support Mechanism
Small ⁴	1.4 M by 2020 5.3 M by 2030	276,245 As of March 2019	<ul style="list-style-type: none"> Establishing ENE-FARM Partners (manufactures, gas companies and constructors) Commercializing fuel cells(PEFC) for application by 2019 Commercializing fuel cells(SOFC) for application by 2021 	<ul style="list-style-type: none"> Subsidy for purchase (national government initiative)
Medium ⁵	No target	SOFC:2		<ul style="list-style-type: none"> Subsidy for purchase of (national government initiative)

³ Targets can be units installed and/or total installed capacity in the size range indicated

⁴ <5 kW (e.g., Residential Use)

⁵ 5kW – 400 kW (e.g., Distributed Residential Use)



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Large ⁶	No target			
District Grid ⁷	No target			• e.g., no Value-Added Tax applied to fuel cell generated electricity
Regional Grid ⁸	No target			
Telecom backup	No target			
H₂ Production	Target⁹	Current Status	Partnerships, Strategic Approach	Support Mechanism
Fossil Fuels ¹⁰	Procure 300,000 ton of Hydrogen annually by 2030		• Japan-Australia Hydrogen Supply Chain pilot project	• Subsidy for R&D, demonstration (national government initiative)
Water Electrolysis ¹¹ (PEM, Alkaline, SOEC)	Reduce the cost of hydrogen to JPY30/Nm ³	10.9 MW	• Large scale 10MW water electrolyser Project has started in Fukushima.	• Subsidy for R&D, demonstration (national government initiative)
By-product H ₂				
Energy Storage from Renewables	Target¹²	Current Status	Partnership, Strategic Approach	Support Mechanism

⁶ 0.3MW – 10 MW (e.g., Industrial Use)

⁷ 1MW – 30 MW (e.g., Grid Stability, Ancillary Services)

⁸ 30MW plus (e.g., Grid Storage and Systems Management)

⁹ Target can be by quantity (Nm³, kg, t) and by percentage of total production; also, reference to efficiency capabilities can be a target

¹⁰ Hydrogen produced by reforming processes

¹¹ Please indicate if targets relate to a specific technology (PEM, Alkaline, SOEC)

¹² Can be expressed in MW of Installed Capacity to use the electricity from renewable energy generation, and Annual MWh of stored energy capacity



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Power to Power ¹³ Capacity	No target			
Power to Gas ¹⁴ Capacity	No target			· Subsidy for R&D, demonstration (national government initiative)

¹³ Operator has an obligation to return the electricity stored through the use of hydrogen back to electricity

¹⁴ Operator has the opportunity to provide the stored energy in the form of hydrogen back to the energy system through multiple channels (e.g., merchant product, enriched natural gas, synthetic methane for transportation, heating, electricity)