Country Update

JAPAN

May 20th, 2014

21st IPHE SC Meeting

Oslo, Norway

International Partnership for Hydrogen and Fuel Cells in the Economy

H2/FC Basic Energy Plan (updated by Cabinet on 11th April 2014)

(1) Promotion of Stationary FC

- Residential FC (Ene-Farm): Target 1.4 mil unit by 2014, 5.3 mil unit by 2030
  - ・Installation subsidy toward self-sustained market (by FY2016), continuous support for R&D/standardization for cost reduction
- Stationary FC in commercial / industry application
  - ・Support for RD&D toward early commercialization (mainly for SOFC)

(2) Creation of preferable market conditions for FCV commercialization

- Build 100 HRSs by FY2015 and streamline regulations/ R&D for cost reduction

(3) Promote new tech such as H2gas-based power generation, toward wider H2application

- Promotion of new H2 techs such as H2gas-based power gens can contribute to increase mass introduction of H2 in the market and H2 cost can be decreased.

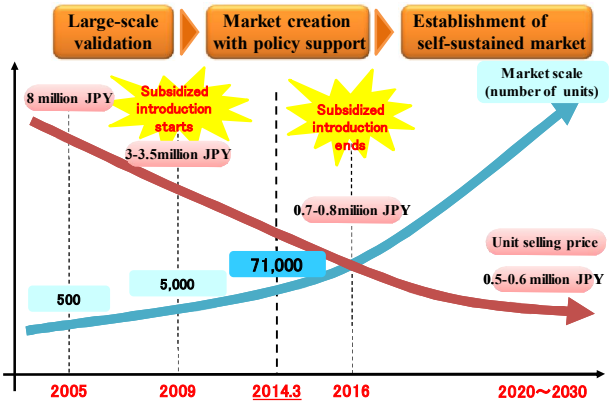
(4) R&D for large-scale H2 production/storage/delivery technologies for stable supply

- R&D effort on H2 production/storage/delivery techs that can contribute to large-scale storage/long-distance delivery with low-cost/large volume hydrogen supply

(5) Develop H2/FC Roadmap toward "H2/FC society"

- Develop a roadmap toward H2/FC society and establish a committee to follow the progress.

Residential FCs (“Ene-Farm”)



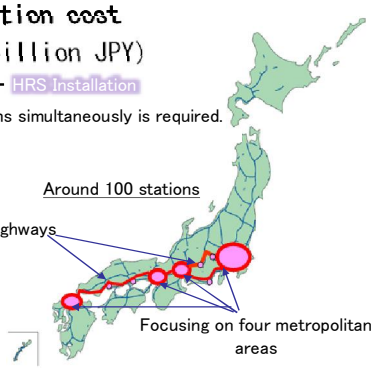
- Subsidy: 20 billion JPY (2014.3-2015.2)
- Total units installed: 71,000 (as of 2014.3)
- Target:
  1.4million units by 2020
  5.3million units by 2030

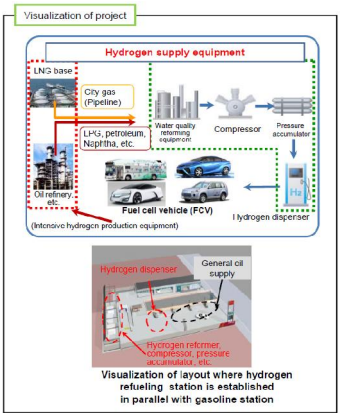
H2 Refueling Stations

- Prior to market introduction of FCVs (2015), 100 HRSs will be installed in 4-major-populated-areas (Tokyo, Aichi, Osaka, Fukuoka)
- METI subsidizes about 50 % of HRS installation cost (2014FY 7.2 billion JPY)

FCV Commercialization + HRS Installation

-> Carrying out both tems simultaneously is required.





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Subsidy Scheme for HRS (2014FY)

Fueling ability (average) [Nm^3 / hr]	Types of HRS	Grant rate	Upper subsidy limit (million JPY)
more than 300	On-site (partial / full packaging)	Fixed	280
	On-site (Except above)	50%	280
	Off-site (partial / full packaging)	Fixed	220
	Off-site (Except above)	50%	220
	Movable	Fixed	250
100 to 300	On-site (partial / full packaging)	Fixed	180
	On-site (Except above)	50%	180
	Off-site (partial / full packaging)	Fixed	150
	Off-site (Except above)	50%	150
	Movable	Fixed	180
One Hydrogen production equipment for Hydrogen Shipping facility (10 equipments are maximum by one site)		50%	60
Liquid hydrogen receiving and feeding equipment for HRS		50%	40

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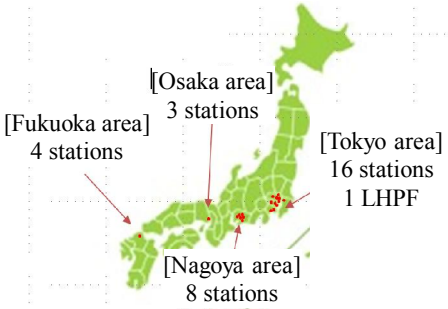
Status of HRSs (as of May 20th)

FCVs Market Introduction (2015)

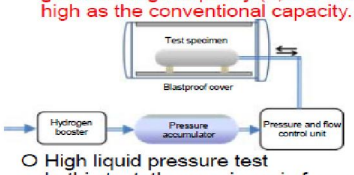
31 stations : budget secured
1 facility for large H2 production facility:



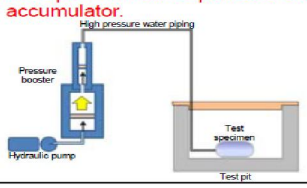
CRADLE (Large-size high pressure compound vessels test facility)

Examples of tests

○ High-pressure gas cycle test
This test is as follows: 1,000 pressure cycles are applied; the vessel is cut off; then the vessel is checked for damage. The gas discharge capacity (2,000 m³/h) is at least 130 times as high as the conventional capacity.



○ High liquid pressure test
In this test, the specimen is forced to burst at a pressure exceeding 225% of the pressure that is actually used. This test specimen corresponds to a 500 L (5 m) class pressure accumulator.




Before bursting


After bursting

- METI subsidized 3 billion JPY
- World largest test facility!
- Possible to use for development of any H2 products

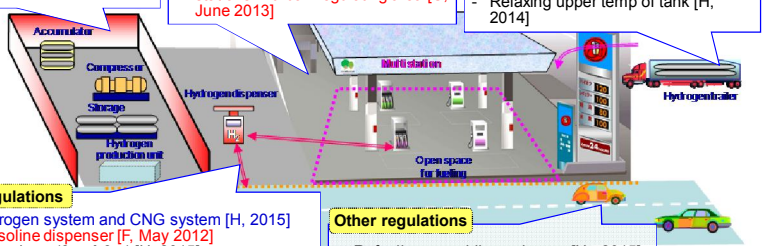
Streamlining Regulations for HRS

Regulations on materials
- Codes on safety inspections (requires overhaul inspection) [H, 2014]
- Simplification on safety design margin review process (4x → 2.4x) [H, 2013]
- Wider listing of material for pipes [H, -2015]
- Codes on composite tanks for high pressure vessels [H, 2013]
- Codes on requirements of listed materials [H, 2015]
- Relaxing safety design margin (4x → 2.4x) [H, 2015]

Regulations on location
- Codes on installation of 70MPa stations [H, Dec 2012]
- Increasing maximum hydrogen storage capacity in city area) [B, 2013]
- Codes on installation of LH2 stations [H/F/B, 2013]
- Codes on small hydrogen stations [H/B, 2014]
- Codes on installation of hydrogen stations in urban regulating area [U, June 2013]

Regulations on operations
- Self refueling [H / F, Feb 2013]
- Relaxing maximum limit of refueling pressure [H, 2013]

Transport regulations
- Relaxing maximum limit of pressure for delivery tank [H, Mar 2014]
- Adaption of glass-ball PRD [H, -2015]
- Labeling on on-board tank [H, Mar 2012]
- Relaxing upper temp of tank [H, 2014]



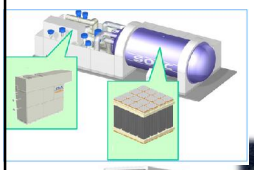
Clearance/distance regulations
- Distance between hydrogen system and CNG system [H, 2015]
- Co-installation with gasoline dispenser [F, May 2012]
- Distance from public roadway (8m →6m) [H, 2015]
- Definition of explosion-proof codes near dispenser [H, Mar 2013]
- Distance between pre-cooler and protectives (10m→8m) [H, 2013]

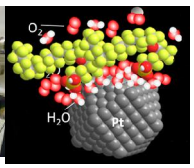
Other regulations
- Refueling on public roadways [H, -2015]
- Definition of compressor with electrolyzer capability [H, Mar 2014]

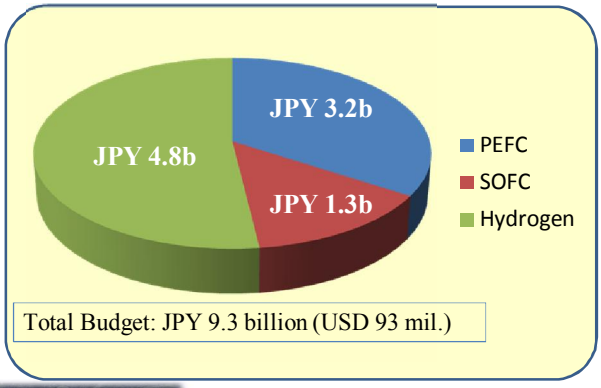
H: High Pressure Gas Safety Act
B: Building Standards Act
U: Urban Planning Act
F: Fire Defense Law

Red: Revised
Blue: in revision
Black: in review

NEDO's Programs on H2 & FC in 2014







Total Budget: JPY 9.3 billion (USD 93 mil.)

New NEDO PJ: Energy Carrier Project (2014-2017)

Renewable Energy Source

Theme 1: Hydrogen Production

H_2

Electrolyzer etc.

Theme 2: Hydrogen Conversion

Energy Carrier

Liquid H2
Chemical Hydride etc.

H2 Storage