

Japanese ET Work

Focusing on Outreach Activities in
JHFC Project

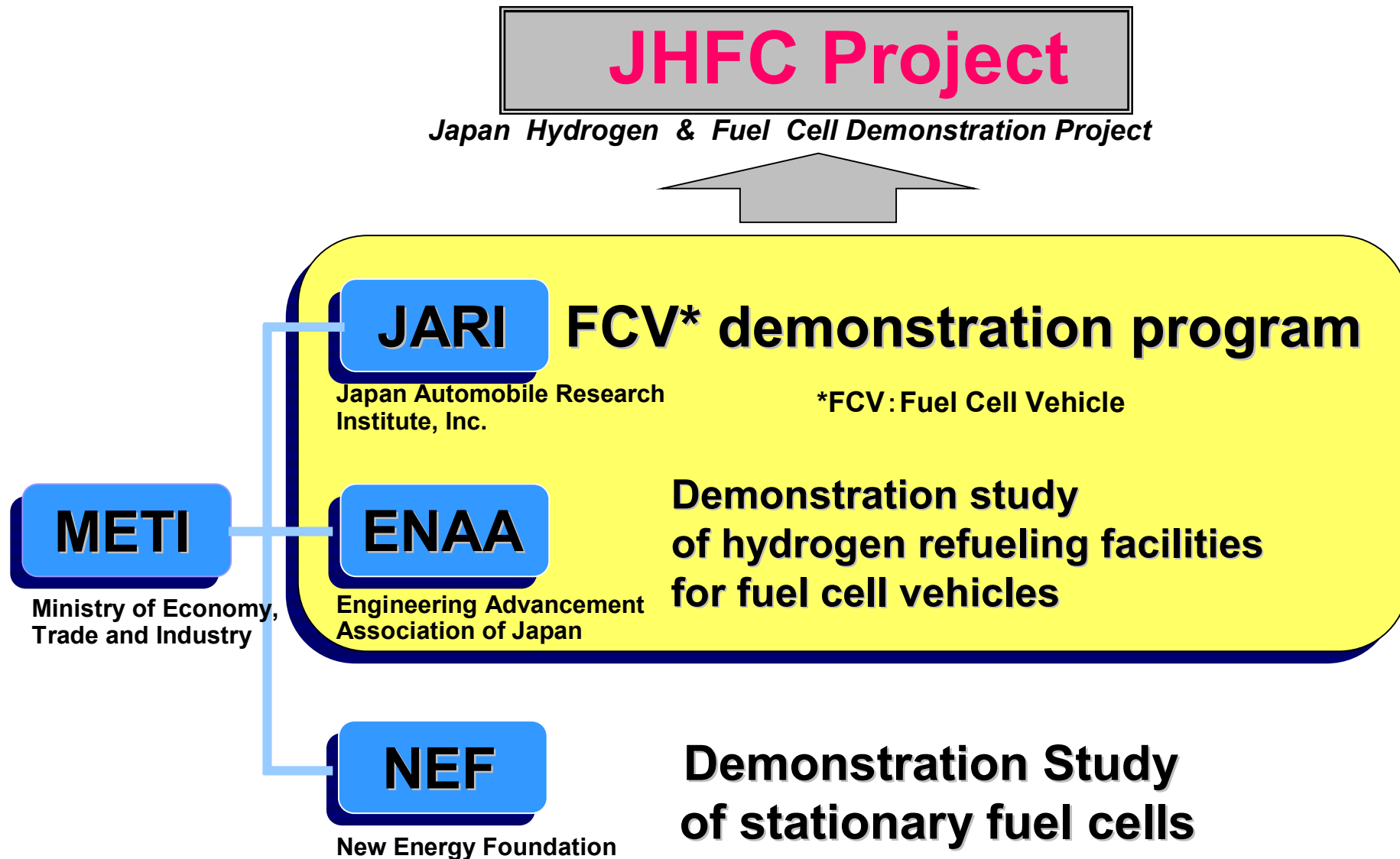
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August 4th, 2005

Japan Automobile Research Institute

- Outline of JHFC Demonstration Project
- JHFC Organization and Framework
- JHFC Demonstration FCVs & Hydrogen Stations
- Education and Training Work in JHFC Outreach Activities
- Future Plan for Education and Training

Positioning of the JHFC Project



- **Test Vehicles**

Hydrogen FCVs

- **Refueling Stations**

Hydrogen Stations (CHG & LH)

- **Period of Implementation**

2002 FY ~ 2005 FY (4 years)

- **Amount of Subsidies**

2.0 Billion Yen ≒ \$17 Million (2002 FY)

2.5 Billion Yen ≒ \$20 Million (2003 FY)

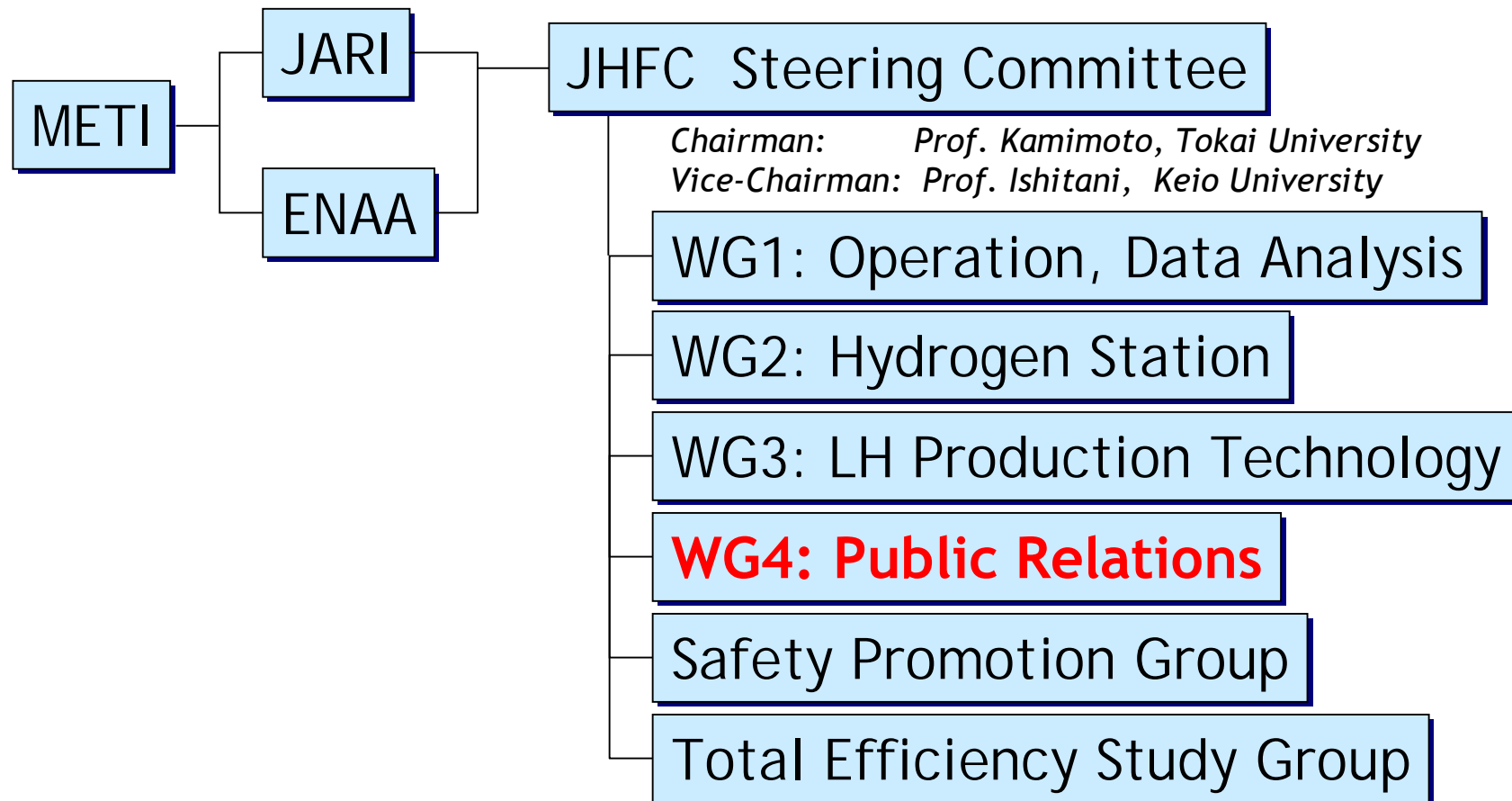
2.0 Billion Yen ≒ \$17 Million (2004 FY)

1.8 Billion Yen ≒ \$16 Million (2005 FY)

Objectives

1. To clearly show Energy-Saving Effect and Environmental Impact
 - Energy Efficiency of FCVs compared with ICEV.
 - Emissions & CO2 Reduction
2. To acquire Data for Codes & Standards Development and Certification Practices
3. To analyze Well to Tank, Tank to Wheel Efficiency based on Japanese Situation
4. To raise Public Awareness regarding FCVs and Hydrogen Stations









JHFC Organization



Framework of Roles at JHFC

JARI	Car Makers	ENAA	Infra. Makers
<ul style="list-style-type: none"> •Offer FCV garage (free of charge) •Share the cost of test •Analyze test data •Report to METI 	<ul style="list-style-type: none"> •Offer test vehicles •Operate fleet test •Acquire test data 	<ul style="list-style-type: none"> •Pay station construction cost •Pay station operation cost •Analyze test data 	<ul style="list-style-type: none"> •Construct stations •Operate stations •Refuel to registered FCVs (free of charge) •Conduct maintenance of stations •Acquire test data

Participating Companies (Automakers)

Toyota Motor Corp.	Nissan Motor Co., Ltd.	Honda Motor Co., Ltd.	Mitsubishi Motors Corp.
			
Toyota-made stack	UTCFC-made stack	Ballard-made stacks	Ballard-made stacks
Compressed hydrogen 35 MPa	Compressed hydrogen 35 MPa	Compressed hydrogen 35 MPa	Compressed hydrogen 35 MPa
DaimlerChrysler AG	General Motors Corp.	Toyota/Hino Motors, Ltd.	Suzuki Motors Corp.
			
Ballard-made stacks	GM-made stack	Toyota-made stack	GM-made stack
Compressed hydrogen 35 MPa	Liquid hydrogen	Compressed hydrogen 35 MPa	Compressed hydrogen 35 MPa

FCV and FC Bus for JHFC Project

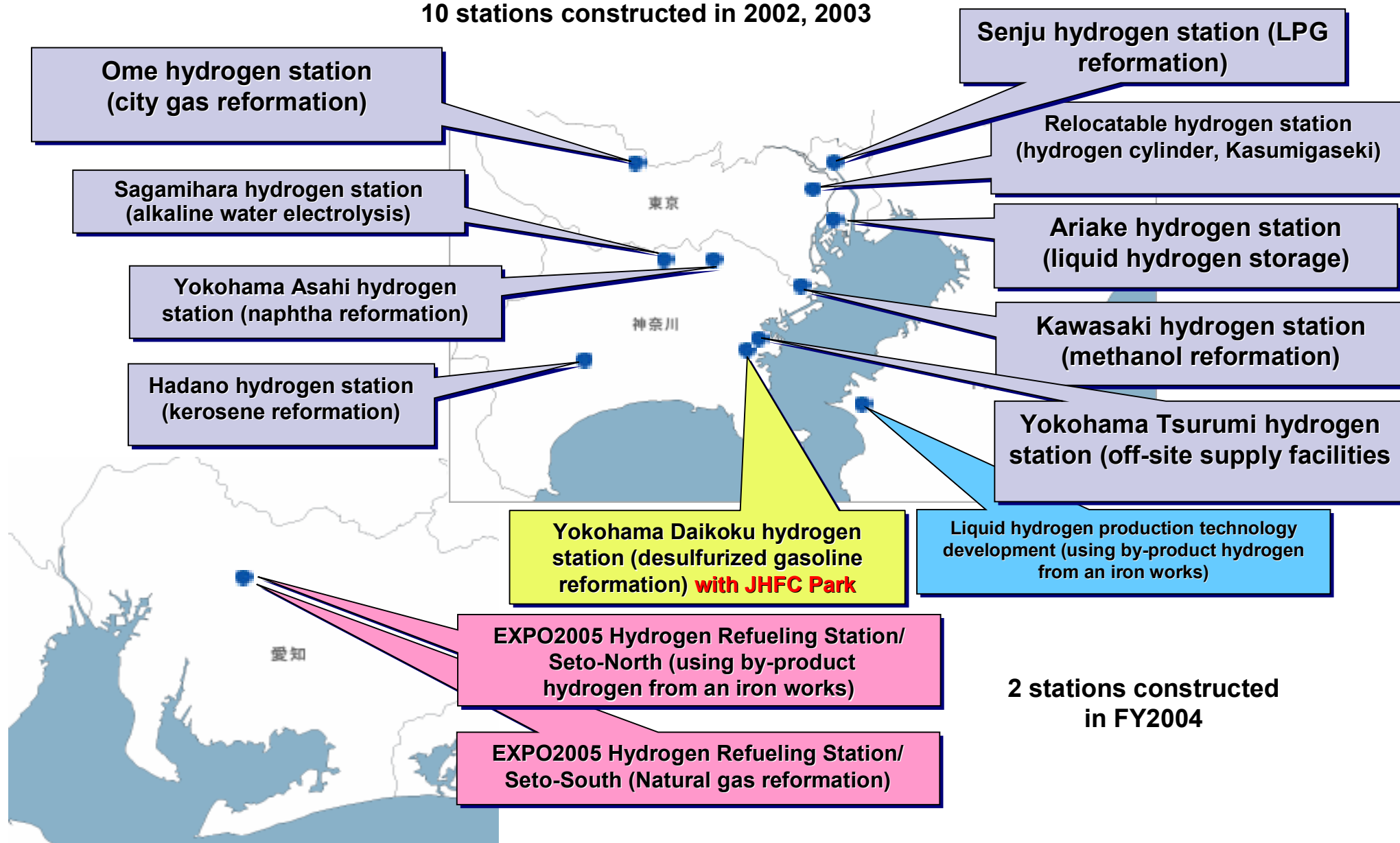
Demonstration FCV			General-Use FCV
FCV	For Demo Test 13	Owned by Automakers ▪ Compressed Hydrogen : 12 ▪ Liquid Hydrogen : 1	<ul style="list-style-type: none"> ▪ Leased FCV for government, local governments, and private companies ▪ FCV owned by Automakers
	For Commercial Use 8	Owned by Automaker (Operated as a Metropolitan Service Bus in Tokyo)	
FC Bus	For Events 1	Owned by Automaker	FC Bus owned by Automaker

Participating companies (infrastructure manufacturers)

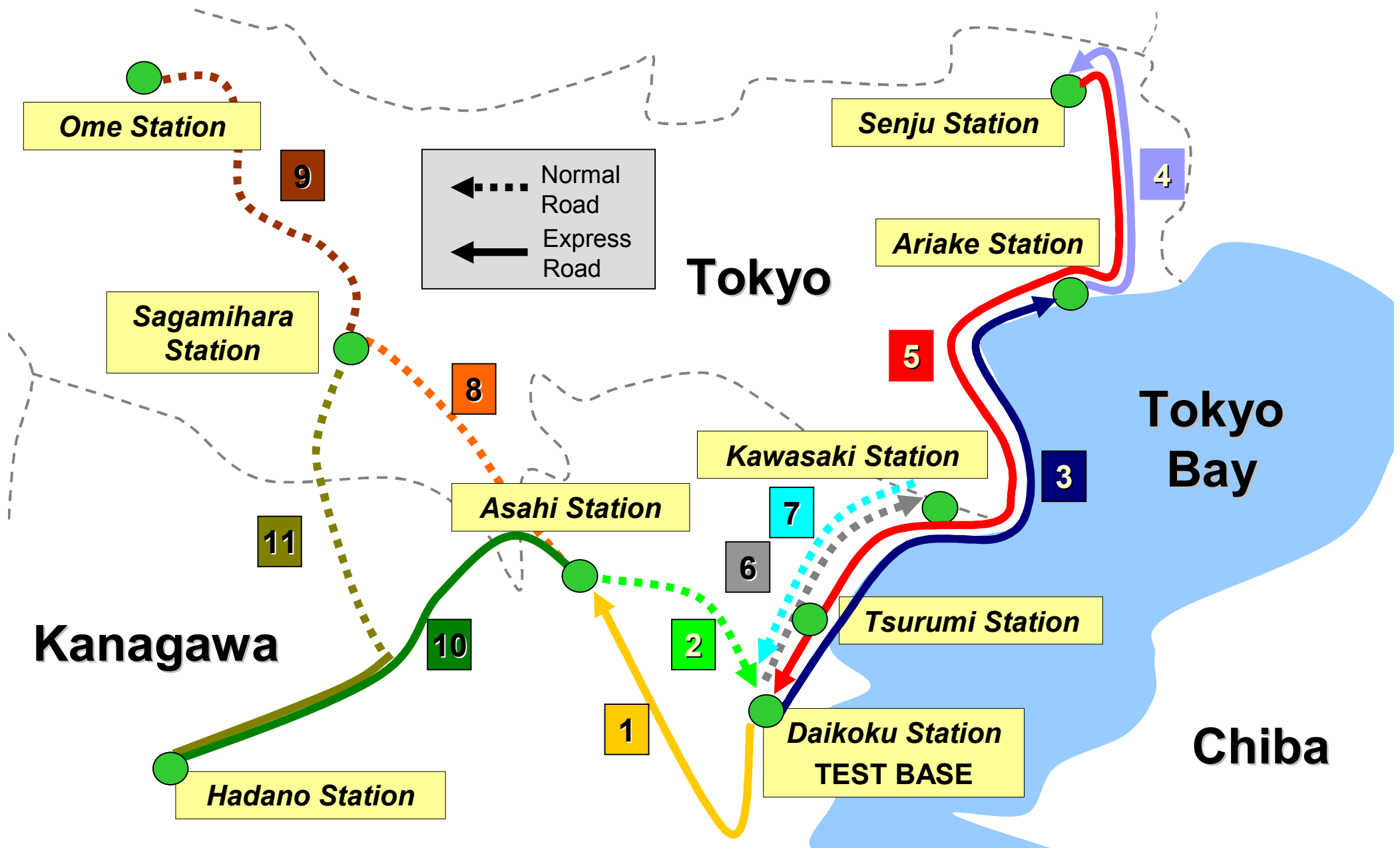
FY2003 14 companies		FY2004 15 companies	
Nippon Oil Corp.	(naphtha reformation)	Kurita Water Industries Ltd.	(alkaline water electrolysis)
Cosmo Oil Co., Ltd.	(desulfurized gasoline reformation)	Sinanen Co., Ltd.	(alkaline water electrolysis)
Showa Shell Sekiyu K.K.	(liquid hydrogen storage)	Itochu Enex, Co., Ltd.	(alkaline water electrolysis)
Tokyo Gas Co., Ltd.	(LPG reformation)	Idemitsu Kosan Co., Ltd.	(kerosene reformation)
Iwatani International Corp.	(liquid hydrogen storage/off-site hydrogen)	Babcock-Hitachi K.K.	(city gas reformation)
Japan Air Gases Ltd.	(methanol reformation)	Tsurumi Soda Co., Ltd.	(off-site hydrogen)
Taiyo Nippon Sanso Corp.	(compressed hydrogen storage/LPG reformation)	Toho Gas Co., Ltd. (since FY2004)	(natural gas reformation)
Nippon Steel Corp.	(liquid hydrogen production technology/by-product hydrogen)		

Hydrogen-Refueling Facilities

10 stations constructed in 2002, 2003

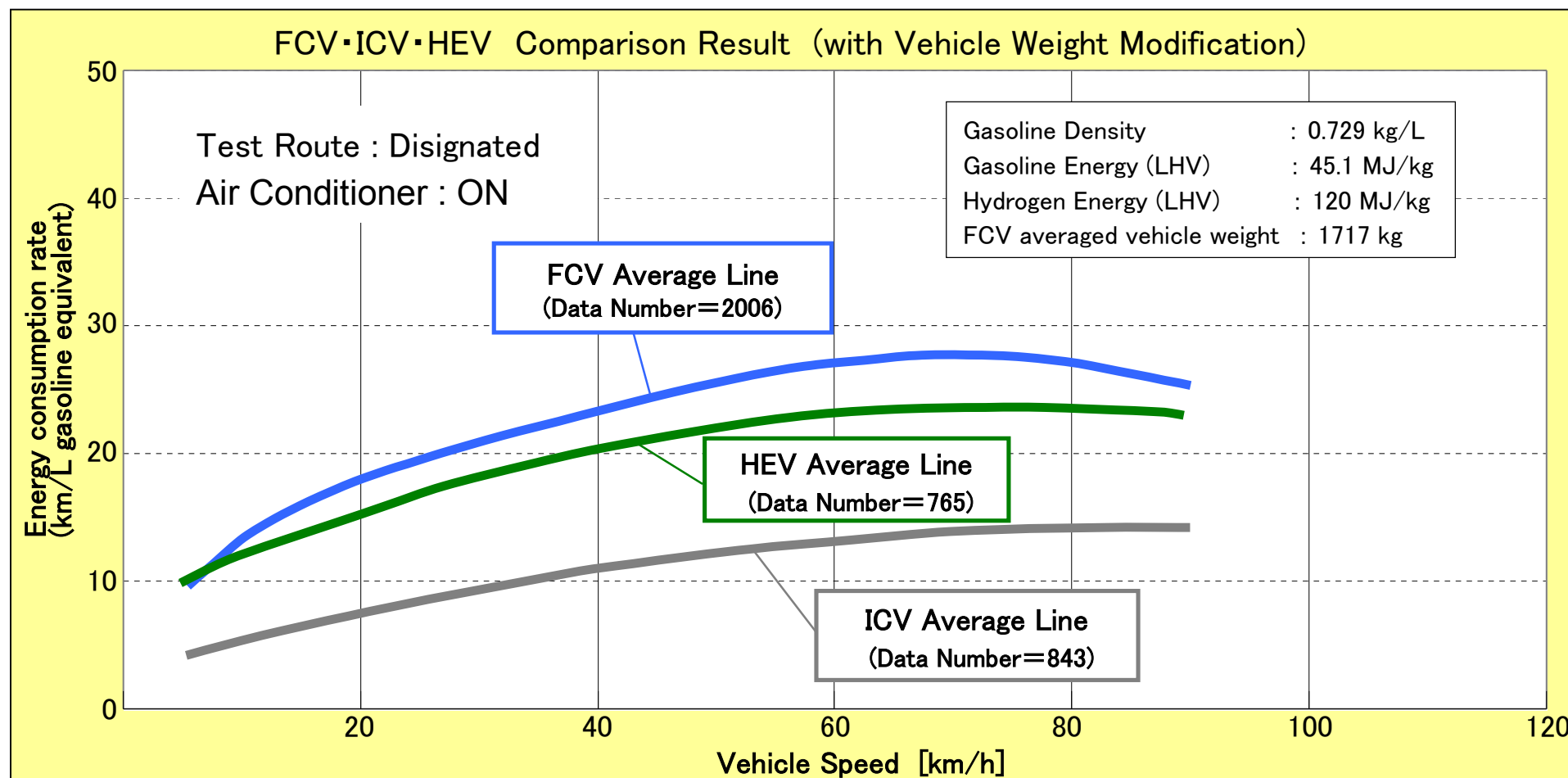


Designated Route on Public Road



Project Output – FCV Performance Clarification

Compared with ICV and HEV, FCV showed better energy consumption rate per vehicle weight.



ICV Group : Toyota Crugar, Nissan X-TRAIL, Honda CR-V, Opel Zafira, Mitsubishi Grandis, Suzuki wagonR

HEV Group : Toyota Prius, Former Prius, Estima Hybrid, Nissan Tino Hybrid, Honda Insight

FCV Group : Toyota FCHV, Nissan X-TRAIL FCV, Honda FCX, GM HydroGen3, DaimlerChrysler F-Cell, Mitsubishi FCV, Suzuki wagonR-FCV

- JHFC Park Open House on Weekdays
- FCV School for Children
- JHFC Hydrogen Station Tour
- Participation in Various Conference & Events
- JHFC Seminar
- Public Awareness Survey

External View of JHFC PARK

Opening: March 12, 2003

Location: Yokohama



JHFC Park Open House on Weekdays

Everyone can participate the event with reservation in advance.



1. Lecture: “FCV and Hydrogen Energy” or PR Video Show

2. JHFC Park Facility Tour

Hydrogen Station,
FCV Garage,
FCV Maintenance Room,
Showroom



3. FCV Test Ride – available on every Thursday

Teaching Materials for Lecture

■ Teaching material

■ Brochure designed for children



<For children>



<For adults>

FCV School for Children



FCV Workshop for junior high school students in Osaka

At Osaka ATC Hall (Suminoe Ward, Osaka)

October 9, 2004

80 junior high school students
in suburbs of Osaka took part

FCV School for Children

Sagamihara Chuo elementary school
(Sagamihara, Kanagawa Prefecture)

December 15, 2004

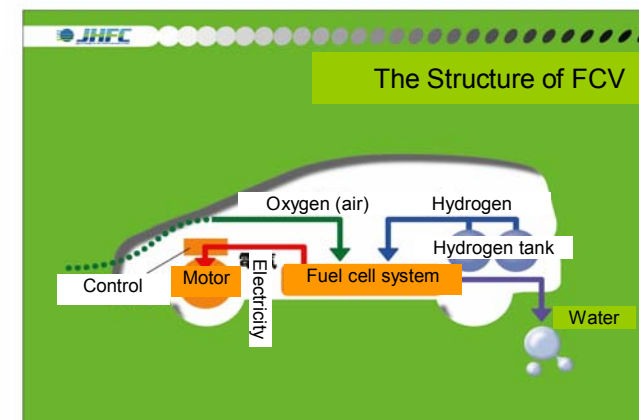
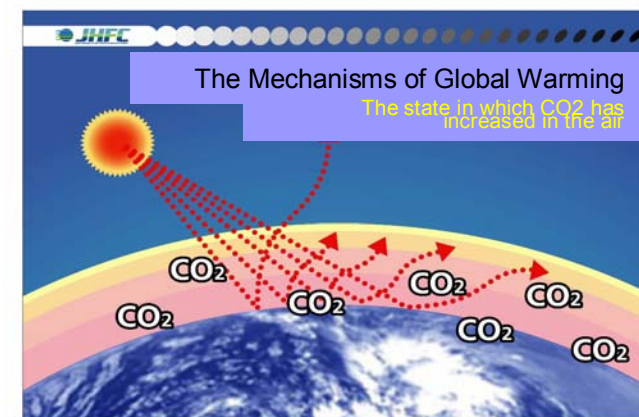
115 students took part in lecture/handicraft class
(Including learning of JHFC Sagamihara
Hydrogen Station)

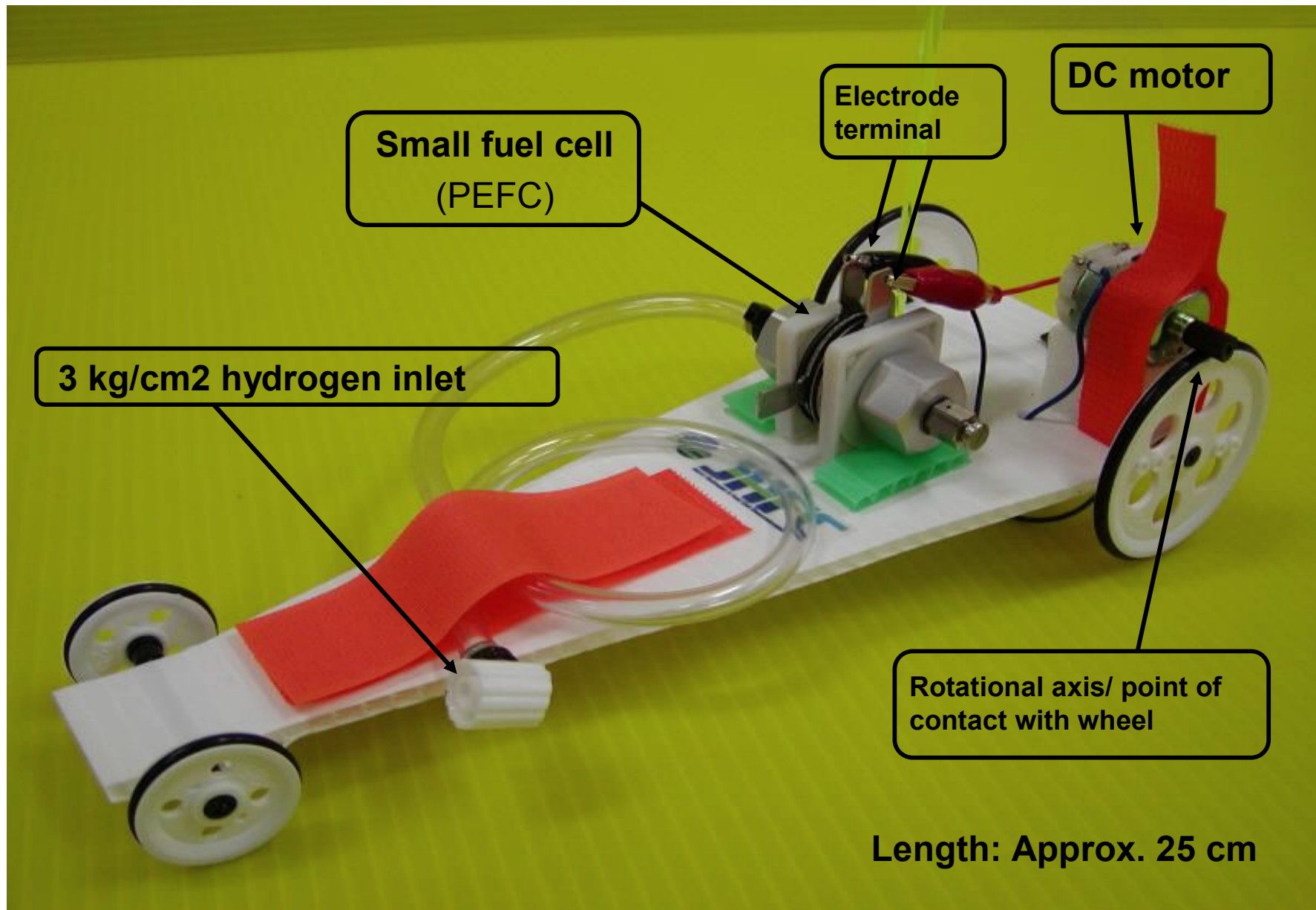
309 students took part in test-riding FCV/FC bus



■ "Fuel Cell Vehicles and Hydrogen Energy"

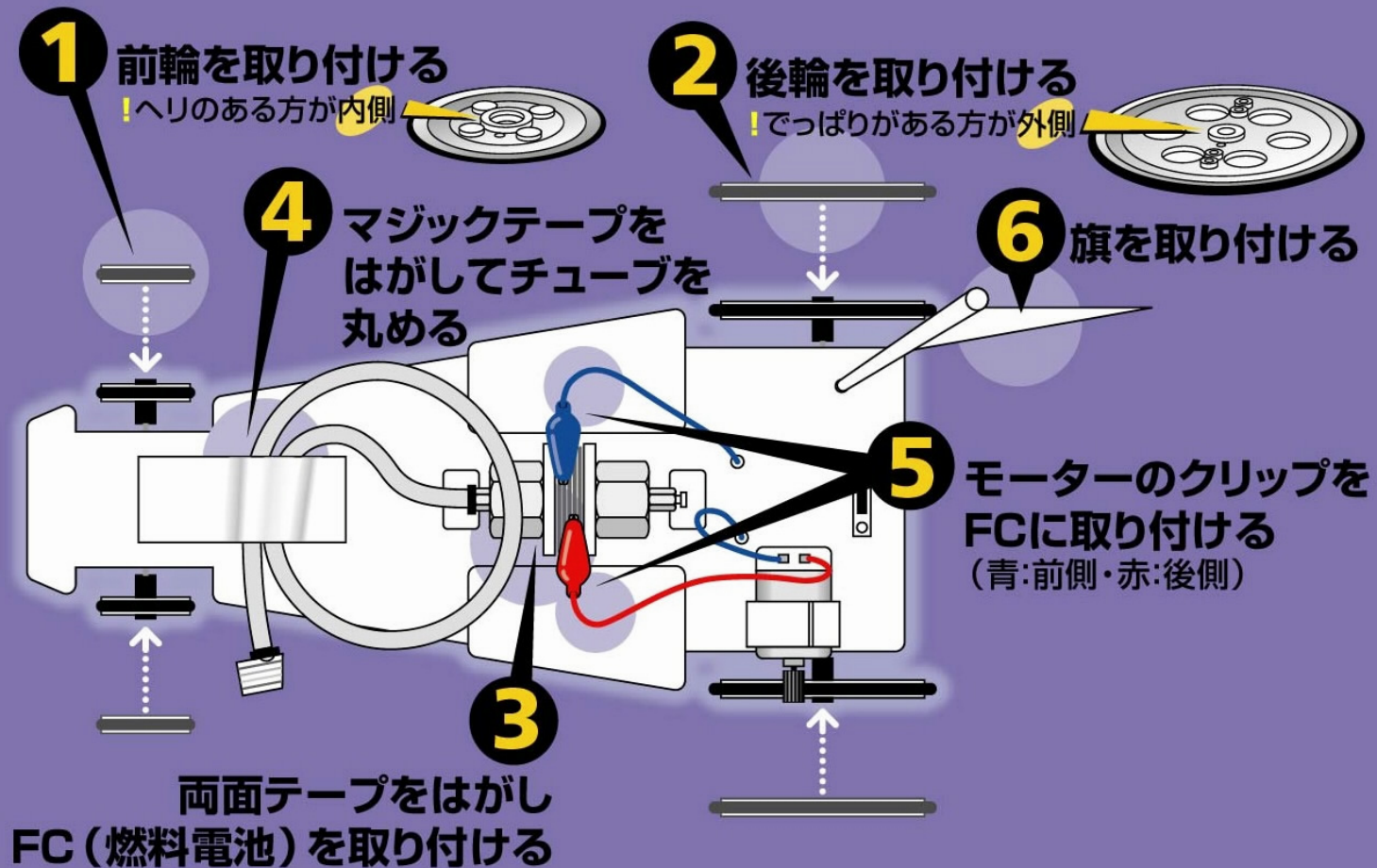
Lecturer: Hisanori Ando, chief researcher, National Institute of Advanced Industrial Science and Technology (AIST), Takashi Shirakawa, part-time teacher, Toin Yokohama University





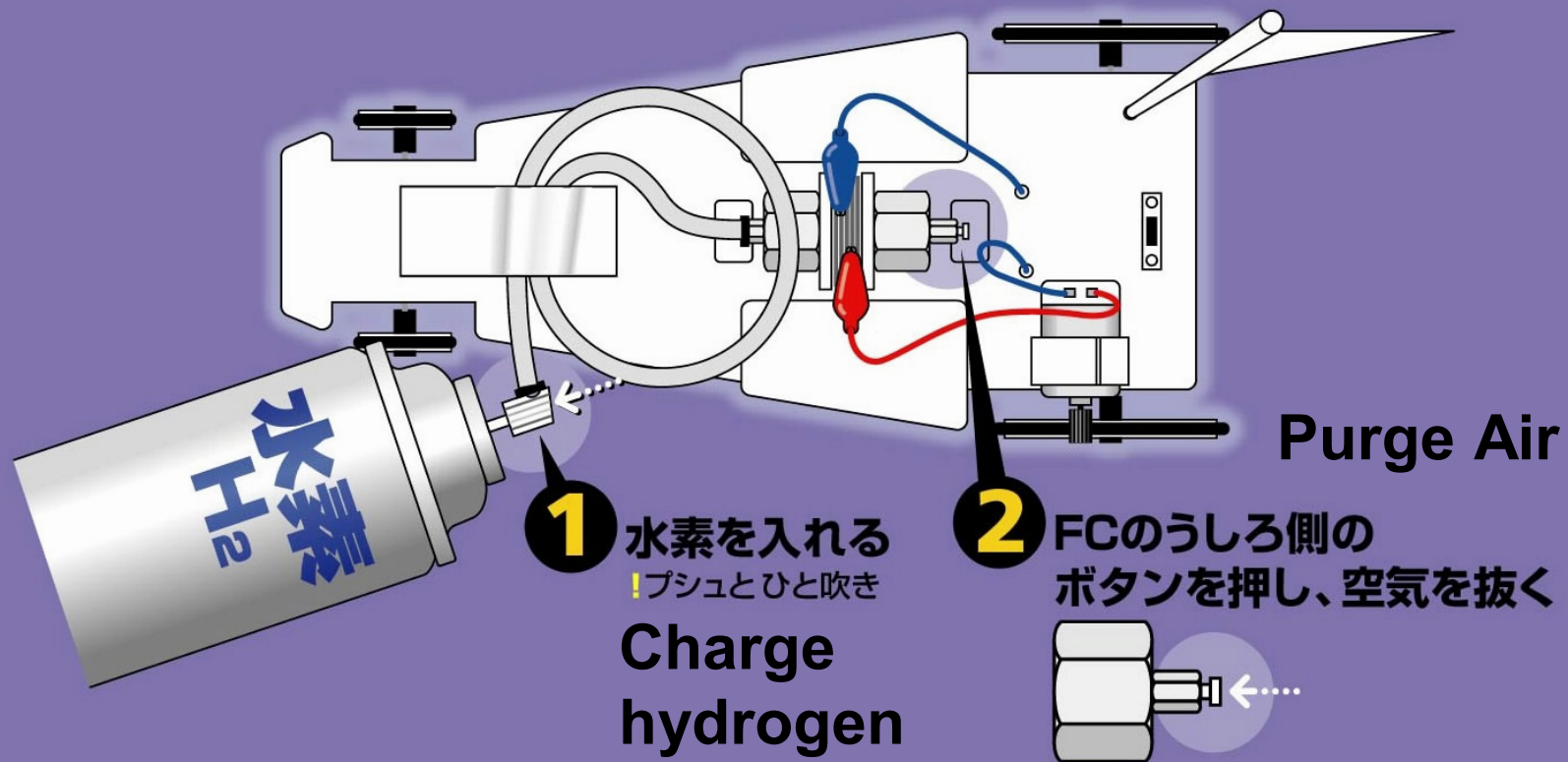
How to Build Mini-FCV?

FCVキットの作り方



How to Fuel Hydrogen?

水素充てんの方法



FCV School for Children — Test-ride —

■ Participating vehicles



Toyota FCHV



Nissan X-TRAIL FCV



Honda FCX



GM HydroGen3



**DaimlerChrysler
F-Cell**



**Toyota/Hino
FCHV-BUS2**



**Mitsubishi
FCV**

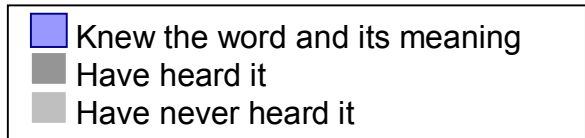
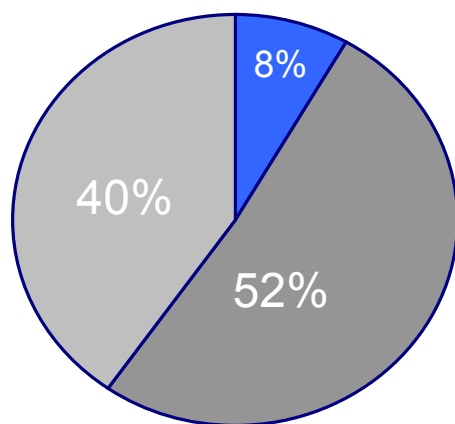


**Suzuki
wagon R-FCV**



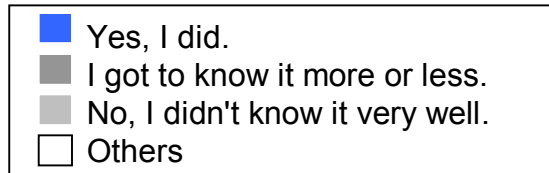
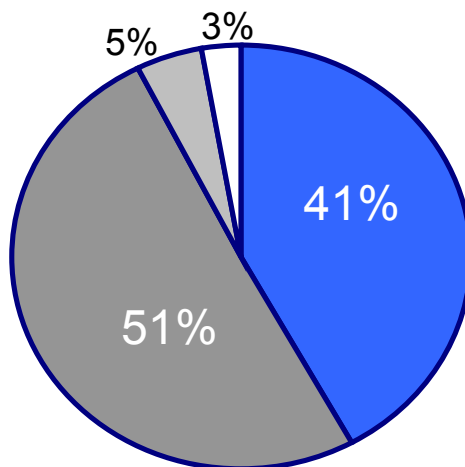
Have you ever heard the word fuel cell vehicles?

(Children N = 97)



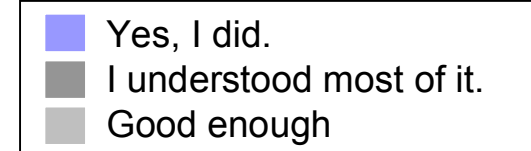
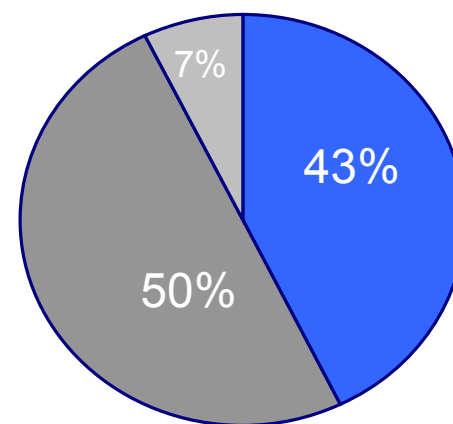
Did you get to know the fuel cell vehicle well by taking part in this school?

(Children N = 97)



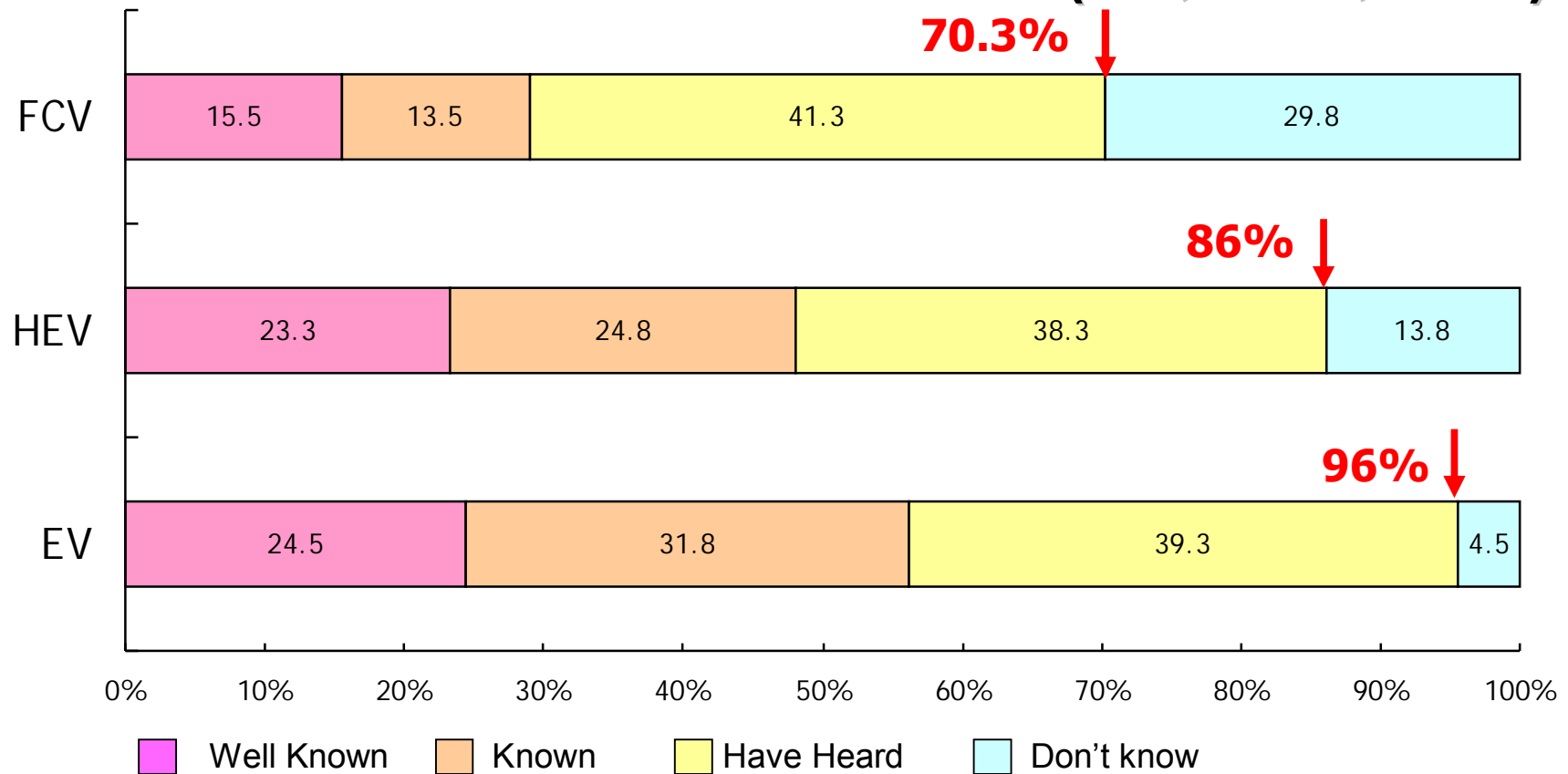
Did you understand the fuel cell vehicle well by taking part in this workshop?

(Teachers/parents N = 21)

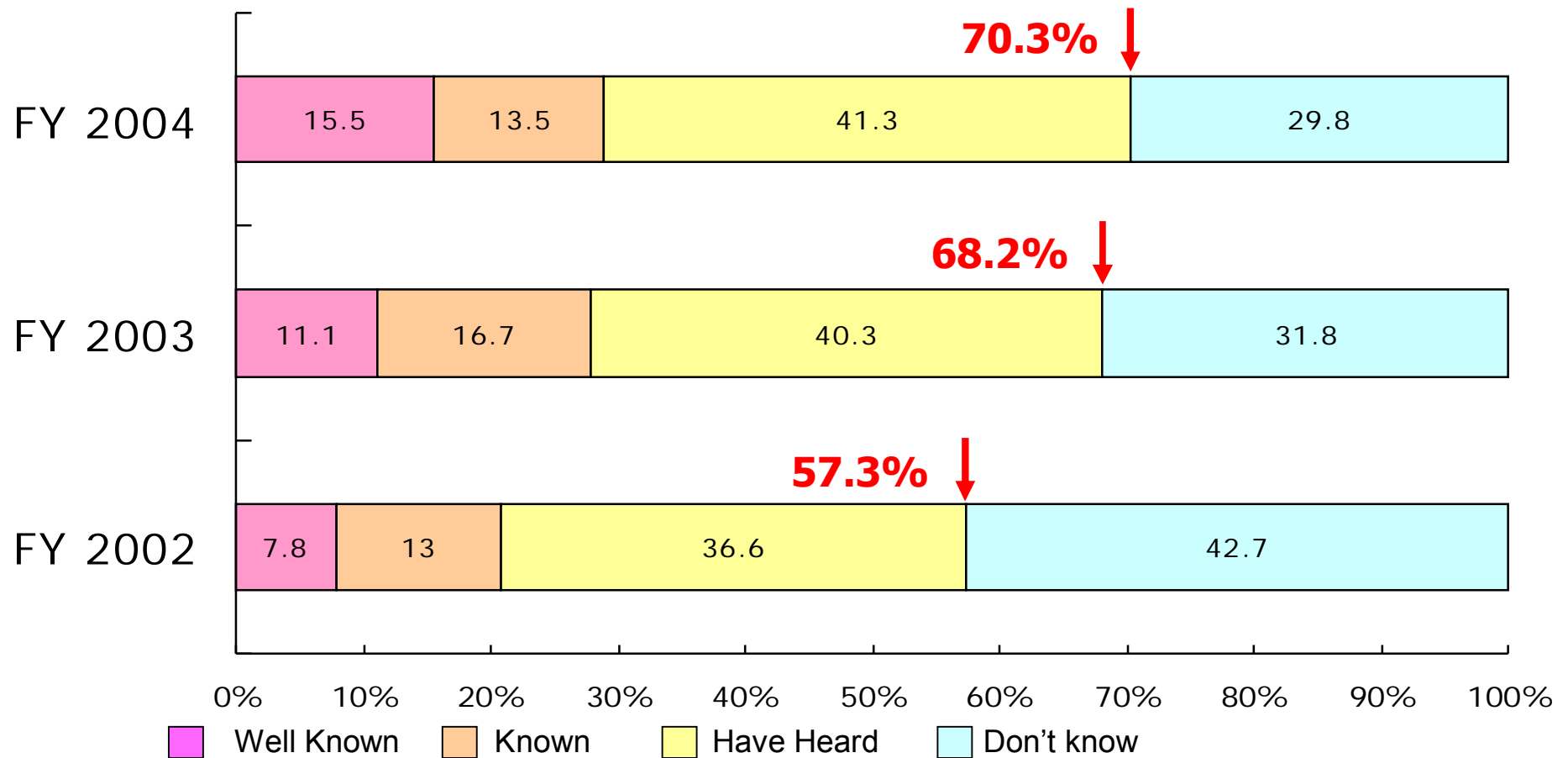


Public Awareness in Tokyo Area (1)

Q: Do you know Clean Energy Vehicles
(EV, HEV, FCV)?



Q: Do you know FCV ?



- **Continuation of JHFC Park Open House events**
- **FCV School for Children at various area in Japan**
- **Lecture of hydrogen safety for public**
- **Information Exchange in International Level**

Thank you for your attention

<http://www.jhfc.jp/>