

A Filling Station Started Providing Petrol and Hydrogen

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1. Governmental Measure

The Ministry of Land, Infrastructure, Transport and Tourism (MLIT) revealed the figure for certified new low-carbon house plans “The Act of Carbon Reduction Promotion for Urban Areas”. The report says that a total of 290 plans of 138 houses and 152 apartment units qualified. These certified households are eligible for a tax reduction. Also, the installation space for a photovoltaic generator, cogeneration, fuel cell (FC) and storage battery is exempt from the floor area ration. (Jutaku Shimpō, April 30, 2013) * http://www.mlit.go.jp/toshi/city_plan/eco-machi.htm

2. Local Governmental Measures

(1) Kanagawa Prefecture

On April 16th, Kanagawa Prefecture announced that real estate acquisition tax would be reduced to half as a smart house promotion. This tax reduction is available for applicants who receive the prefectural subsidy for smart energy facilities. The prefecture expects 3,000 applications. To be subsidized for the facilities, houses must have home energy management systems (HEMS) and at least one of the facilities including a domestic photovoltaic generator and a FC. (The Nikkan Kogyo Shimbun, April 17, 2013; Kanagawa Shimbun, April 18, 2013)

(2) Osaka Prefecture

Osaka Prefecture added fuel cell vehicles (FCVs) in the “Active Osaka Promotion Fund” which financially supports projects, such as developing electric vehicles (EVs), by firms in the prefecture, and started inviting applications. The development of FCV systems, components and prototypes will be assisted with the fund. The prefecture will back up the manufacturing industry of Osaka by helping smaller businesses and ventures to develop their businesses. (Nikkan Jidosha Shimbun, April 24, 2013)

(3) Hamamatsu City

Hamamatsu City is inviting businesses which want to research the feasibility and impact of various new energies and energy management systems (EMS) as a

promotion measure. The maximum subsidy is ¥1 million for each project. The six target new energy areas are micro hydro, micro wind turbine and biomass generations, solar thermal utilization, gas cogeneration systems and FCs. (The Nikkan Kensetsu Kogyo Shimbun, April 25, 2013; Architectures, Constructions & Engineerings News (Daily), April 30, 2013)

(4) Itabashi-ku

Itabashi-ku city office, one of 23 administrative districts dividing the center of Tokyo, compiled an action plan to combat global warming (for the Itabashi-ku area) to aim for a reduction of 1.8% in greenhouse gas emissions of 1990 by 2020. To achieve this, an energy service company (ESCO) will assess public buildings owned by Itabashi-ku to save energy, and renewable energy will be promoted for buildings including residential houses as well as 11 other important measures. Additionally, energy will be centrally managed in the region to build a smart city as a measure separate from the 13 measures. The subsidy targets for renewable energy introduction by FY 2015 are 1,411 photovoltaic generation systems for homes and 17 for offices as well as 300 FCs. (Nikkan Kensetsu Sangyo Shimbun, May 7, 2013)

(5) Shizuoka Prefecture

On September 19th and 20th, Shizuoka Prefecture will hold an exhibition of products related to next generation vehicles by smaller businesses of the prefecture at the Suppliers' Center of Toyota Motor in Toyota City, Aichi Prefecture. With Toyota's cooperation, smaller business will be assisted in their technological development and sales channel extensions of EVs, hybrid vehicles (HVs) and FCVs. (The Shizuoka Shimbun, May 10, 2013)

3. Technology Developments of FC Related Elements

(1) Kyoto University

A study group of Associate Prof. Noriaki Sano at the Kyoto University developed a new material in which

alloy particles made of palladium and platinum are distributed in carbon nanohorns (CNHs), a very small structured carbon material. A 60 mm long vertical hole was made in a 3 mm diameter carbon electrode, and a palladium and platinum wire was inserted in the hole. The electrode and wire electrically discharged in water, and they were vaporized at approximately 5000°C. As they cool down, nanometer-length CNHs were created with nanometer-diameter palladium and platinum particles distributed in CNHs. Also, other metals such as gold, copper, titanium and molybdenum were tried with palladium, and six different alloy particles were distributed in CNHs. The group found out that alloy particles could be created with any metals which vaporize at 5000°C. Being conical shaped carbon molecules, CNHs are potential catalyst material for devices including FCs. They are a type of the carbon nanotube with cylindrical shaped molecules. (The Nikkei Business Daily, April 24, 2013)

(2) The University of Tokyo

A study group of Assistant Prof. Akihiro Okamoto at the University of Tokyo unveiled how microbes generate electricity. The mechanism of electron transportation by microbes was found to be different from that expected. Some microbes obtain electrons by oxidizing organic matters, and they transport electrons to iron oxide and electrode material outside their cells as a part of their metabolism. This mechanism is used in microbial fuel cells (MFCs), which decompose biomass or organic wastewater as an energy source, as the core reaction. The process was previously considered to be where by microbes secreted molecules for transportation of electrons, and the molecules received electrons. Then molecules were thought to transport electrons to electrodes, which leads to electricity generation. The group researched *Shewanella oneidensis* MR-1 with Prof. Kenneth Nealson of University of Southern California, and they discovered that the electron discharging mechanism was different from that previously believed. By in-vivo electrochemical techniques, the mechanism was uncovered where by microbes secrete molecules, flavin, to bond with proteins on their cell surfaces, and the electrons go outside the cell while the bond lasts. The key is the protein-bound molecules, and they allow 1000 times or more efficient

transportation electrons than the previous transport model. With this way to accelerate electron transportation to the cell exterior, MFCs potentially become more efficient. (The Denki Shimbun, April 16, 2013; The Nikkei, April 30, 2013;

<http://www.t.u-tokyo.ac.jp/etpage/release/2013/2013040801.html>)

(3) Kyushu University

On May 3rd, a study group of Prof. Naotoshi Nakashima at the Department of Applied Chemistry of the Kyushu University announced that a new technology to extend the operating life of polymer electrolyte fuel cells (PEFCs) by 100 times compared to conventional products. Becoming popular for domestic use, this kind of FC has a reformer to extract hydrogen from natural gas, and CO is generated at the reformation. Because CO deteriorates platinum, the performance of the FC tends to go down as it is used. Having a higher boiling point than water, phosphoric acid can be used as an electrolyte to increase operation temperature, which allows for a reduction in CO. However, liquid phosphoric acid is disadvantageously lost to the electrode catalyst slowly. The group solidified phosphoric acid, poly(vinylphosphonic acid) (PVPA), like resin for the electrolyte, and made electrode catalysts with a new durable material for the test cell. As a result, the cell sustained its performance for 400,000 generation which is 100 times more than conventional products at the durability test. Additionally, their cell allows for the elimination of the need for condenser to avoid water in the electrolyte evaporating, which can reduce 30% of production costs. The group aims to commercialize the product in five years for a FCV battery (The Nikkei, The Nishinippon Shimbun, May 4, 2013; The Nikkan Kogyo Shimbun, May 6, 2013; <http://www.nature.com/srep/2013/130503/srep01764/full/srep01764.html>)

4. Business Plans of Ene-Farm and Smart House

(1) Daiwa House

On April 15th, Daiwa House announced that 175 environmentally conscious houses would be built in Tsukuba City, and they would be on sale from this summer. All houses will be equipped with a photovoltaic generator, storage battery, Ene-Farm, light emitting diode (LED) for lighting, power supply

for an EV charger and HEMS. To be a model for low-carbon town which is promoted by the city, whole area's energy consumption will be open to the residents through HEMS. The total development area is approximately 5.1 ha, and each housing lot is planned to be over 180 m². (The Ibaraki Shimbun, April 16, 2013; The Nikkei Business Daily, April 23, 2013)

(2) Osaka Gas

On April 25th, Osaka Gas revealed its consolidated result for the fiscal year ended March 2013. The net profit was ¥52.4 billion which is an increase by 16% that of the previous year. The sales were ¥1,380 billion which is a raise of 7% on the previous year. The Ene-Farm and liquefied natural gas (LNG) sales led the growth. The sales are planned at ¥1,058 billion which is a 9% increase and the net profit is expected to be ¥64.5 billion which is a 23% increase for the fiscal year ending March, 2014. (The Nikkei, The Kobe Shimbun, April 26, 2013)

On April 22nd, Osaka Gas revealed facilities for the experiment starting from June at its apartment house "Next 21" (six stories above ground and one story underground, 18 units and total floor area 4,577 m²) in Tennouji-ku, Osaka City to the press. Solid oxide fuel cell (SOFC) Ene-Farm and gas engine cogeneration are equipped, and each unit has HEMS to visualize gas and electricity consumption and usage estimation for an easy understanding and saving energy. The energy saving target is approximately 20% of the average household consumption. The firm aims to give a shape to its new energy saving life style for 2020. (The Yomiuri Shimbun, The Asahi Shimbun, The Mainichi Newspapers, The Sankei Shimbun, Architectures, Constructions & Engineerings News (Daily), Osaka Nichinichi Shimbun, The Kobe Shimbun, The Chugoku Shimbun, April 23, 2013; The Denki Shimbun, May 7, 2013)

(3) The Japan Gas Association

On April 17th, Mitsunori Torihara, the chairman of the Japan Gas Association, announced at a press conference that roadmaps would be developed to achieve its target planning "Vision for 2030" made in October 2011. The roadmap for Ene-Farm is already compiled, and its target is 100,000 unit sales each year by FY 2015, which is the last year of governmental subsidy, and 0.5 million by FY 2025 to

achieve a total installation of 5 million units by 2030. (The Nikkan Kogyo Shimbun, The Nikkei Business Daily, The Denki Shimbun, April 18, 2013)

(4) Honda and Sekisui House

On April 22nd, Honda Motor and Sekisui House announced their cooperation in the smart house field. Opening a future life showroom "Sumufumulab" on April 26th in the Umekita area, Osaka City, Sekisui House will jointly investigate possibilities of robots for home with Honda's robot technology. For the energy side, these firms together plan to examine the potential of smart houses with Ecovill EV and FCV later. Accelerating its smart house development, Honda has built a house for experiment in Saitama City. (The Denki Shimbun, April 23, 2013)

(5) Kyowa Homes

Kyowa Homes, a housing constructor in Akita City, built a house which is equipped with a photovoltaic generator, Ene-Farm and lithium ion battery (LIB) to provide energy nearly 100%. The house is a part of the "Tagonishi Eco Model Town Project" which is planned by Sendai City. (Akita Sakigake Shimpo, April 23, 2013)

(6) NTT Docomo

On April 23rd, NTT Docomo announced that a new HEMS, which manages five power sources shown below including a photovoltaic generator and FC, was developed. With Nissan Motor's cooperation, a new storage battery system for EVs is planned to be developed to utilize the HEMS. The five power sources are; 1) purchased electricity from a utility firm, 2) photovoltaic generation, 3) stored energy in LIB, 4) electricity produced by natural gas FC and 5) electricity stored in an EV. Taking fluctuation of usage, production and temperature into consideration, the HEMS organizes energy use for the most efficient way as well as providing energy from multiple sources during power cuts. From April 27th to May 6th, the firm will display the product in a housing exhibit in Sendai City, and start the sale afterwards. (The Nikkan Kogyo Shimbun, Fuji Sankei Business i, April 24, 2013; Fuji Sankei Business i, May 13, 2013)

(7) Saibu Gas

On April 26th, Saibu Gas revealed its consolidated result for the fiscal year ended March 2013. The sales were ¥179.438 billion, a 4.6% raise on that of the previous year. The pretax profits were ¥6.583 billion,

a 46.4% raise that of the previous year. The net profit was ¥3.752 billion. The firm earned a growth in profit for the first time in two years. Both natural gas and Ene-Farm increased their sales, which largely contributed to the growth. (The Nishinippon Shimbun, April 27, 2013)

(8) Tokyo Gas

For FY 2012, Tokyo Gas sold 7,600 units of Ene-Farm which became fully available in FY 2009, and targets at 12,000 units for FY 2013. “Extra sales may not be several thousand units due to the premium priced product. However, the previous figures give us very good confidence to clear the target as well as a good start for following years.” says Tsuyoshi Okamoto, the president. A new product costing less than ¥2 million yen is available from early this year, and the firm plans to introduce a small FC for apartment units in the late FY 2013 to attract more consumers for its steady business growth. (The Denki Shimbun, May 2, 2013)

(9) Toho Gas

Toho Gas commits to renovation of established houses as an Ene-Farm sales plan. To enhance sales, training sections will be set up at five branches to give product information and expertise to sales representatives. Also, a cheaper product will be introduced to achieve 1,500 units of sales, the highest target, for FY 2013. To double the figure of the previous year, a 200 unit target of Ene-Farm is set for established houses. Going over the target of 1,300 units, the sales ended with 1,325 units for FY 2012. However, only 105 units, which is less than 10% of the whole sales, were installed for established houses and majority went to new houses. (The Nikkei Business Daily, May 2, 2013)

(10) Toyota Home

Toyota Home, Nagoya City, started to sell smart houses in Wakamatsu-ku, Kitakyushu City for the first in the Kyushu area. These houses are equipped with HEMS, a charger for EVs and plug in hybrid vehicle (PHV) and Ene-Farm. (The Nikkan Kogyo Shimbun, May 2, 2013)

(11) Kokusai Kogyo

Kokusai Kogyo has been managing the whole development of “Green Community Tagonishi” in the Tagonishi area of Miyagino-ku, Sendai City, and 16 houses of the smart village area were revealed to the

public. In each house, originally developed HEMS is equipped to control power from grid, photovoltaic generator, natural gas, FC, storage battery and EV, which increases the self-sufficiency of the houses. Expected to provide 80% of energy requirement, the houses are allocated to increase efficiency with considerations on climatic conditions including wind direction and garden plans. Each household will be charged a ¥5,000 monthly system fee. (Nikkan Kensetsu Sangyo Shimbun, May 13, 2013)

5. Business Plans of FC for Industrial Use

(1) Verizon

On April 30th, a US-based mobile network operator Verizon Wireless announced that it would invest \$100 million to help powering its 19 facilities using solar and FCs in seven states. The installation is planned to finish next year. The project will be able to generate 70 million kWh. ClearEdge Power’s “PureCell Model 400” will be installed at Verizon sites in California, New Jersey and New York. Capable of 60 million kWh production, the system combined with photovoltaic generators powers the corporate offices, call centers, and central offices nationwide. (Dempa Shimbun, May 2, 2013)

(2) Fuji Electric

Fuji Electric will develop a new reformer to extract hydrogen from methane for FCs, and a phosphoric acid fuel cell (PAFC) generation system with the reformer to utilize methane from sewage treatment. The system is targeted for local governments and industrial use. Electricity generated from bio gas such as methane is purchased under the feed-in tariff, which means the FC system can give regular income. Given its potential, the firm judges the product can attract demand. As well as high generation efficiency, the FC system outputs 100 kW and will sell for around ¥70 million, which is 40% lower than gas engines commonly used as independent power source in sewage treatment. Also, characteristically less noise is produced, which allows a reduction in the soundproofing costs. The firm already submitted a proposal to Tochigi Prefecture, and the prefecture plans to install the system in FY 2013. According to the prefecture, ¥60 million is expected for electricity sales each year while approximately ¥20 million goes to the maintenance. (The Nikkei, May 3, 2013)

6. Cutting Edge Technologies of FCV & EV

(1) Osaka Prefecture

Osaka Prefecture organized a promotion vision to prepare chargers for EVs. As at March 2013, 60 quick chargers and 322 normal chargers were installed, which almost cover the populated area without a large gap. Using a subsidy of the Ministry of Economy, Trade and Industry (METI), the prefecture will start subsidizing business operators who facilitate chargers following the vision with half to two thirds the cost of purchase and installation. These chargers must be open to the public with signs and the installation must be completed by October 2014. (The Nikkei, April 17, 2013)

(2) BMW, VW, Daimler and PSA

European auto giants will enter into the EV market. Germany-based BMW invested €400 million in a dedicated production line at its Leipzig plant. At the same time, component production facilities were installed at two plants costing €200 million. The automaker plans to sell a small car in Europe this year under the “BMW_i” brand as well as release in the US and Japan after next year. The vehicle is largely glued together rather than welding as a part of full design revisions for EV. VW plans to start commercial scale production of EV based on a small car “up!” in this year for the debut. The vehicle drives 150 km on a single charge. The firm also plans to add EV in its leading product “Golf”. Daimler tries to reduce initial cost of EV by leasing the batteries for €65 each month. Orders have been taken for their two-seater microcar “Smart” since last year. Planning an electric version of its luxury car Mercedes-Benz B-Class, the firm tries to expand its EV range to nine. France-based PSA Peugeot Citroën will develop a small EV for urban transportation together with the French government. (The Nikkei, April 18, 2013)

(3) Auto Shanghai

On April 21st, the “15th Shanghai International Automobile Industry Exhibition” started in Shanghai, China. Japan-based automakers have clearly driven towards eco cars since consumers in China became more environmentally conscious due to the serious air pollution. Nissan Motor displays a new concept EV, “Venucia” exclusive to the Chinese market for the first time. Andy Palmer, an executive vice president of Nissan, shows their confident for good sales of the

product with the promoted environmental consciousness of the Chinese users. Germany-based VW and US-based GM take the lead in low-fuel consumption by increasing the output of smaller engines, and are rapidly improving in PHV development which is a field currently dominated by Japanese firms. (The Nikkei, April 21, 2013)

(4) Green Lord Motors

From April 26th, an EV venture Green Lord Motors, Kyoto City, will take orders for a sports EV “Tommy Kaira ZZ”. Being ready for commercial production, the vehicle will sell for ¥8 million before tax. The firm also plans to sell the chassis to automakers in the emerging markets. The first fiscal year sales are targeted at 100 vehicles, and a couple of thousand are expected, including the chassis sales, for following years. Post graduate students of the Kyoto University started this venture in 2010, and it acquired the rights of the road-going sports car that a smaller business had produced in Kyoto to make over to electric. (The Nikkei, April 22, 2013)

(5) Nissan Motor

On April 22nd, Nissan Motor revealed its production line for an EV storage battery at the Smyrna plant, Tennessee. To be more cost-competitive, complete localized production is achieved by manufacturing their storage battery, motor and body with the Japanese standard quality control method in the states. The LIB plant for EV is equipped with a cleanroom facilitating a highly controlled environment of temperature and humidity. The maximum production capacity for the battery is 200,000 units each year. To manufacture “Leaf” fully within the states, the line for the motor was constructed in the engine plant, an hour drive distance, to provide the component smoothly to the Smyrna plant. Available from December 2010, Leaf has sold only approximately 60,000 vehicles around the world over 30 months. To increase the sales, the cheapest option of the produce was reduced by \$6,400 (approximately ¥630,000) to offer the minimum price of \$28,800 this year in the US. For charging infrastructure, the automaker will cooperate with the States Department of Energy (DOE) who wants to bring the number of charging stations in business operators’ premises up by a factor of ten. (The Nikkei, April 24, 2013)

Nissan Motors introduced an enhanced EV into the

market last November, and the price was reduced this April. METI will prepare infrastructure including chargers to backup EVs. (The Nikkei Business Daily, April 23, 2013)

(6) Mitsubishi Motors

April 23rd, Mitsubishi Motors reported recalling 3,889 vehicles produced from this January to March to the Ministry of Land, Infrastructure, Transport and Tourism (MLIT). Having been confirmed as a problem with its LIB, “Outlander PHEV” was also found faulty in the control program for its motor. One battery of the vehicle was found overheated and melted at a dealer in Kanagawa Prefecture in March, and trouble caused by a battery was reported in both Tokyo and Gifu Prefecture. The automaker has been looking into the battery to find causes. (The Nikkei, April 24, 2013)

On April 24th, Mitsubishi Motors disclosed that the series of LIB problems of its EV appeared to be caused by dropping the batteries accidentally at their inspection. Prevention measures will be developed, and recall including 4,305 vehicles of “Outlander PHEV” will be reported to MLIT in May. Also, 115 EVs including replaced parts of i-MiEV and Minicab-MiEV will be recalled. (The Nikkei, April 25, 2013)

(7) 22 Businesses including MHI and 13 Universities including Kyoto University

22 businesses including Mitsubishi Heavy Industries (MHI), OMRON and Kajima Corporation and the Kyoto University with 12 universities established a consortium “Wireless Power Transfer for Practical Application” to develop wireless energy transmission technology for products such as EVs and smartphones. Funded by the business members, the research will use study results of the university members to develop a contactless charging technology with microwave transmission. The consortium aims to bring out devices to charge moving EVs in five years and smartphones on a table at meetings. As a further goal, the technology is planned to be applied to a microwave transmitter of space-based solar power. (The Nikkei, May 2, 2013)

(8) BYD

A China-based major car and battery manufacturer BYD Auto, Guangdong, announced that its EV bus production would be launched in the US. Aiming for the first delivery in 2014, a new assembly plant will be

built in California, and is expected to produce approximately 1,000 vehicles annually. This plant will be the second oversea production site for the manufacturer after Bulgaria. (The Nikkei, May 4, 2013)

7. Experiments and Business Plans of Hydrogen Filling Stations

(1) JX Nippon Oil & Energy and NEDO

On April 19th, JX Nippon Oil & Energy, New Energy and Industrial Technology Development Organization (NEDO) and the Research Association of Hydrogen Supply/Utilization Technology (HySUT) set up a hydrogen refueling point for FCVs in a petrol station in Ebina City, Kanagawa Prefecture. Having both facilities for petrol and hydrogen, the filling station stores highly pressurized hydrogen transported by tanker truck to the premise. Taking approximately three minutes to fully fill each vehicle, the hydrogen facility fuels five to six four-seater sport utility FCVs in an hour. The filling station does not have charging facility for hydrogen refueling, and repeatedly feeds FCVs dedicated for the experiment in the working filling station. Data will be collected for the joint experiment project of organizations including NEDO. The experiment participants will investigate issues for size reduction and the commercialization in the experiment. (The Sankei Shimbun, Fuji Sankei Business i, April 17, 2013; The Yomiuri Shimbun, The Denki Shimbun, April 19, 2013; The Asahi Shimbun, The Nikkei, The Sankei Shimbun, Nikkan Jidosha Shimbun, The Tokyo Shimbun, The Chunichi Shimbun, The Kyoto Shimbun, Kanagawa Shimbun, The Hokkaido Shimbun, The Shizuoka Shimbun, The Chugoku Shimbun, Fuji Sankei Business i, The Kahoku Shimpo, April 20, 2013; The Denki Shimbun, The Nikkei Business Daily, The Nikkan Kogyo Shimbun, The Nikkan Kensetsu Kogyo Shimbun, Architectures, Constructions & Engineerings News (Daily), The Chemical Daily, April 22, 2013)

JX Nippon Oil & Energy will construct a hydrogen production facility at the Negishi Refinery, Yokohama, aiming for the first operation around 2015. Hydrogen is generated from the processing of petroleum products, and a new facility is under consideration to use the hydrogen. Their target is at 40 hydrogen filling facilities throughout Japan by 2015, and is

helping to promote FVCs by preparing hydrogen infrastructure from production to supply. (The Nikkei Business Daily, May 13, 2013)

(2) Iwatani

On May 7th, Iwatani Corporation revealed to the press its Iwatani R&D Center in Amagasaki City, Hyogo Prefecture, finished in April. The construction costs of this seven story building were around ¥4 billion, and approximately 50 employees work there. The facility provides a -253 °C environment that liquefies hydrogen for research use. A hydrogen filling station for FCVs is planned to start from spring 2014, which will be the first for Iwatani to operate fully. A vehicle can be refueled in three minutes. The filling station will be able to supply one vehicle at a time, and the capacity is planned to expand to three vehicles to be fed at any one time. (The Yomiuri Shimbun, The Asahi Shimbun, The Sankei Shimbun, The Kobe Shimbun, May 8, 2013)

8. Development and Business Plan of Hydrogen Storage and Transportation Device

Maruhachi, Sakai City of Fukui Prefecture, provides carbon fibers for a wide range of products including suitcase and golf club shafts, and has researched a hydrogen tank using carbon fiber as well as data collection for a few years. Valuing these activities, METI selected their joint development plan for a container accommodating high pressure to transport and store hydrogen for FCVs with Osaka University as one of the “Innovation Center Establishment Assistance Program” in February. The firm plans to develop a plastic container. Several layers of carbon fiber in various directions cover outside of a plastic container for a couple of centimeters thick, and the container is cured in a heated chamber. By the process, the tank potentially gains the same strength level of steel while reducing its weight by approximately one third. (Fukui Shimbun, April 13, 2013)

9. New Technology & Product with FC Technology

(1) Tanita

Tanita started to sell its affordable alcohol sensor with FC technology “ALBLO FC-1000” which processes in approximately 15 seconds from a blow through the mouth mouthpiece coming in the package. The measuring range is 0.05 to 2 mg/L which is

displayed in 0.01 mg units. Realizing portability, the dimensions are 33 mm deep, 72 mm wide and 145 mm high, the weight is 212 g. The device sells for ¥39,900, and its dedicated data management software sells for ¥21,000. The firm targets 30,000 unit sales for the first fiscal year. (The Nikkan Kogyo Shimbun, April 22, 2013)

(2) AIST, JST, Atsumitec

On May 7th, Japan Science and Technology Agency (JST) announced that a generation system using exhaust gas from automobiles or motor bikes was successfully developed with a study result of Yoshinobu Fujishiro, a research group leader at the National Institute of Advanced Industrial Science and Technology (AIST). An auto components supplier Atsumitec, Hamamatsu City, had a contract with JST which financed the development through its Risk Taking Fund for Technology Development. Primarily, a SOFC and a thermoelectric conversion element were combined to make synergy cells. Then, 320 synergy cells were connected to create the system of 150 mm long, 114 mm wide and 71 mm deep. In the system, the SOFC generates power from hydrogen left unburned in exhaust gas, and the thermoelectric conversion element produces electricity from exhaust heat from the exhaust gas and heat from the SOFC. Atsumitec mounted the system on the exhaust outlet of a motorcycle to test the performance. The result shows 2.5% of energy in the exhaust gas was collected to provide a part of the electricity usage. (The Denki Shimbun, May 8, 2013; The Nikkei Business Daily, The Chemical Daily, May 9, 2013; The Nikkan Kogyo Shimbun, May 10, 2013)

10. Technology Development of FC Related Part

On May 9th, Riken announced that a micro valve for small FCs was jointly developed with Tokai Rubber and the University of Tokyo. The valve uses a thin film of electroactive polymer which changes its shape triggered by electricity. A 0.3 mm diameter flow passage was made for the experiment, and the valve blocked the passage by application of voltage in 0.7 seconds. The maximum pressure resistance capacity is 4 kPa. The new valve produces less noise and vibration than conventional pneumatically controlled valves. (The Nikkei Business Daily, May 10, 2013)

- This edition is made up as of May 13, 2013 -