

Approval of public road driving to FCV made by students

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1. National Policies

The government officially announced the overview of “Promotion cost for introducing environmentally friendly vehicles (Eco-car subsidy)”. Passenger cars newly registered after December 20th that achieved “2015 fuel efficiency standards” or “2010 fuel economy 25%+ standards” and heavy vehicles (trucks and buses) that achieved “2015 fuel economy standards” will be subsidized with 70,000 yen to 900,000 yen per car. The total budget amounts to 300 billion yen. EV, PHV, natural gas automobile, FCV and clean diesel car were categorized in the passenger car. (*Nikkan Jidosha Shimbun: December 12, 24, 2011*)

(2) Ministry of Economy, Trade and Industry (METI)

METI announced that it would unify the connection standards of HEMS (home energy management system) and electric appliances, solar power generation, and EV. It will enable connection between HEMS and equipment of different manufactures, and the development/provision of new services such as energy-saving support will become available. Review meeting of Japan Smart Community Alliance (JSCA) summarized the interim report to promote “ECHONET Lite”, the standard that electronics manufactures participate in. METI will accelerate the diffusion of this system through subsidiary and complete it by the start of energy saving measures next summer. (*The Chemical Daily: December 26, 2011*)

The total proposed budget for fiscal 2010 that was approved by the Cabinet was 90 trillion 333.3 billion yen, in which METI accounted for 1 trillion 493.3 billion yen (including the special account) and special account for energy policy accounted for 725.1 billion yen. On the other hand, 29.2 billion yen of subsidy for promoting introduction of clean energy vehicles to support EV and PHV. Likewise, 2 billion yen for developing advanced technology for practical application of lithium-ion battery (LiB), 3 billion yen for “regional hydrogen supply infrastructure and

Technology demonstration ” to prepare for the introduction of FCV to market, and 13.66 billion yen for demonstration of smart community were allocated.

(*Nikkan Jidosha Shimbun: December 27, 2011*)

METI is going to formulate a strategy to promote the diffusion of storage battery by around this summer. It will set up a project team (PT) across the ministry as of January 6th and aims to integrate the policy-making functions of storage battery, as well as to incorporate needs of the industry and consumers into the strategy beyond the vertically-structured organization. METI made a judgment that formulation of a strategy to promote the diffusion of storage battery was essential for promotion of energy saving and renewable energy. A total of 30 members from three departments in the ministry which hold jurisdiction over the automotive industry and research & development as well as from the Agency of Natural Resources and Energy in charge of energy policy will join the PT. The PT will compile the specific measures by this summer incorporating deregulation measures and standardization of technology strategy to improve the way of research & development and its spread. Of note, the following three areas are positioned as the most critical policy issues: 1) Large storage battery to use when stabilizing large-scale solar power generation (mega solar) and others; 2) stationary battery to cut peak power consumption at home; 3) automotive battery for the next generation cars such as LiB, as well as infrastructure improvement for the propagation of FCV. The PT is going to tackle with these issues immediately.

(*The Nikkei: January 6, 2012, Nikkan Jidosha Shimbun, Tokyo Shimbun: January 7, 2012, the Chemical Daily: January 10, 2012*)

2. Measures by local government:

(1) Fukuoka City

Fukuoka City announced on December 27 that the

project to develop 6 ha of “CO₂ zero emission area” was selected as a pilot project by METI. The area is now under development and will accept occupancy from autumn in 2012, and aims to complete the development by mid-2015. It plans to introduce large capacity solar panels in addition to the latest model of FC and storage battery. At most 3 million yen is going to be subsidized as maintenance cost for houses equipped with solar panels. (*The Nishinippon Shimbun: December 28, 2011*)

(2) Tokyo

Tokyo is going to work on the municipal's first project to have condominiums installed with gas generation system such as FC by condominium developers. In the wake of the Great East Japan Earthquake, diversification of electric power is getting a lot of attention. Tokyo Metropolitan Government will transfer the sites of municipally-owned housing to the private sectors and aims to establish a distributed and self-reliance electric generation system by effectively utilizing surplus heat and electricity generated by gas electric power generation with the intention to promote the reservation of electric power just in case of disaster. The government will start off by recruiting a developer next year. (*Nikkan Kensetsu Sangyo Shimbun: January 10, 2012*)

3. Business development of PAFC

Fuji Electric Co. announced on December 20th that they would install their product 100kWPAFC “FP-1001” at two factories in their group. The company has just succeeded in developing technique to compensate the electrolyte to the entire cell stack, which enables to extend the operational life to 130,000 hours, 2 times longer than the conventional FC. The company will promote the usage as regular electricity for factory production lines to save energy and reduce CO₂ emission reduction, and will utilize it as a means of promotion for customers such as the National Government, the local governments and private companies as a model case for introduction. The PAFC consumes city gas as fuel, and has a function that continues to supply electricity to critical machinery even if power supply is lost due to power failure, by supplying propane from a facility in the factory to continue the operation. Start of operation is scheduled for February 2012. This is the 30th PAFC

installation case for the company. (*The Denki Shimbun, the Nikkei Business Daily, the Nikkan Kogyo Shimbun: December 21, 2011, Dempa Shimbun Daily: January 9, 2012*)

4. ENE-FARM business development

1) Sekisui House

Sekisui House will embark on a business of selling “smart town” in lots, which is environmentally friendly house (Smart House) attached with security service. To start off, the company will begin by selling the large-scale subdivision in Sendai from December 2011, all of which is going to be equipped with solar battery, FC and HEMS. Additionally, the company plans to establish 20% of them as “Green First Hybrid” equipped with storage battery. It is reported that they will expand their business to the Kanto, Chubu and Kinki regions by 2012 and now they are in search of the lands. (*The Nikkan Kogyo Shimbun: December 20, 2011*)

(2) President Mr. Kimura of JX Energy Nikko Nippon Oil revealed his intention to expand electric generation business, while indicating that he would like to lower the cost of the new electric generation system, an ENE-FARM combined with storage battery and solar battery, to 2 million yen by 2015. The new system will be on the market at 6 million yen in the summer 2012 in which power shortage is concerned, but he expects that the demand will increase and the decrease in the cost will be feasible. (*The Yomiuri Shimbun, the Asahi Shimbun: December 20, 2011*)

JX Energy Nikko Nippon Oil raised the 2011 sales target to 2,200 units, almost 50% increase. The company lowered the cost of PEFC type by 20% in April, and introduced SOFC type in October. The orders of SOFC type amounted to 433 units in two months after the introduction, the monitor frame of the pre-sale sold out, and the orders of PEFC type exceeded 1,300 units. (*The Nikkan Kogyo Shimbun: December 28, 2011*)

JX Energy Nikko Nippon Oil will start to maintain the gas stations to strengthen the support system just in case of tsunami or disaster. Many gas stations' electric system was damaged by the flooding that they were unable to fuel. This has led to a project to build a gas stations equipped with water-proof fueling tanks

and emergency generators in Ishinomaki City, Miyagi Prefecture by March 2012, rolling out a total of 12 gas stations nationwide by 2013. The gas station in Ishinomaki is going to be a fortified two-story building with enough earthquake resistance. On the 2nd floor, a 70 kW emergency power generator and FC is going to be installed. On the roof of the fueling space, a 10 kW solar generator is going to be installed. (*Fuji Sankei Business i: December 30, 2011, the Yomiuri Shimbun: January 7, 2012*)

JX Energy Nikko Nippon disclosed on December 30 its intention to start a test sale of ENE-FARM, which is accelerating to spread nationwide in Japan, in Korea as well in 2013. JX Energy Nikko Nippon is the first company going overseas. The company judged that they needed to expand into overseas market to mass produce, preparing for further price reduction. (*Fuji Sankei Business i: December 31, 2011*)

JX Energy Nikko Nippon announced the details of energy diagnostic service for household that will start in 2012. The company is going to develop in conjunction with NEC sales software to diagnose residential energy usage and dwelling performance. Diagnostic consultants will visit each ordinary household after June 2012 and provide useful, free, energy-saving information based on this software, and utilize the outcome for sales proposal of their FC and solar power generation system. (*The Nikkei, the Nikkei Business Daily, the Nikkan Kogyo Shimbun, the Chemical Daily: January 11, 2012*)

(3) Tottori Gas

Tottori Gas group has started selling a town gas and LP gas-corresponding SOFC-type ENE-FARM. The 24 hours of continuous operation enables to supply 70% of electric power for ordinary household. The company has already installed the system at two sites in Tottori City since JX Energy Nikko Nippon was established October 17th. (*The Japan Maritime Daily: December 19, 2011*)

(4) Toshiba

Toshiba and Toshiba FC SYSTEM will strengthen the sales of ENE-FARM (PEFC). In March 2012, they will launch a new model with a sophisticated inverter to improve the overall energy efficiency by 10% as compared with the existing model and reduced number of cells to cut more than 20% cost. The model was devised to accommodate to the cold climate and

various fuels, enabling it to be installed all over the country. The company aims to sell 15,000 units in 2012 and 50,000 units in 2015. Actually, 6,500 units had already been sold by the end of last November. (*The Denki Shimbun, Dempa Shimbun Daily, Fuji Sankei Business i: December 21, 2011, the Chemical Daily: December 22, 2011*)

(5) Osaka Gas

Osaka Gas announced on December 20th that it would launch a PEFC, an ENE-FARM with higher energy efficiency and lower cost by 650,000 yen than the existing ones, on April 2nd, 2012. It was developed jointly with Toshiba group companies. The standard price is 2.6 million yen. It can be obtained with one million yen or so if the current subsidy (maximum: 850,000 yen) continues over to the next year. (*The Asahi Shimbun, the Mainichi Newspapers, the Nikkei, the Sankei Shimbun, the Nikkei Business Daily, the Nikkan Kogyo Shimbun: December 21, 2011*)

(6) Toho Gas

On December 4th, Toho Gas will launch a new model of ENE-FARM developed by Toshiba FC SYSTEMS. The company will raise its annual sales target of 2012 to 1,300 units, more than double of 2011. The company made an OEM agreement with Panasonic group and Toshiba group. Panasonic developed a product of about 3 million yen in April, 15% lower than the existing product, and Toshiba will launch a product of about 2.6 million yen in April 2012, 20% lower than the existing product with improved generation efficiency. (*The Nikkei Business Daily: December 28, 2011, the Chunichi Shimbun: January 6, 2012*)

(7) Yoshicon

Yoshicon will start selling energy-creating houses starting from January with solar power generation and ENE-FARM fitted as standard equipment. The solar power generation is seismic guaranteed and fitted with 4kW battery system with an outlet for charging EV, as well as ventilation and heat shield.

(*The Shizuoka Shimbun, January 5, 2012*)

5. Eco Car Update:

(1) Shizuoka Gas

Shizuoka Gas is going to experiment of introducing "car sharing" using an EV at low-carbon residential district (Eco Town) in Mishima City in collaboration

with Suzuyo Shoji (Shizuoka City). Shizuoka Gas, jointly with Japan Science and Technology Agency (JST), will analyze data and examine environmental impact and economic efficiency. Suzuyo Rent a Car, a subsidiary of Suzuyo Shoji, will take charge of operation of reservation system and maintenance of EV. The experiment will last from January 14 to March 31 at Eco Town. All the 22 houses in the district are going to be equipped with solar power system, FC and a standard charger. Two EVs are prepared for the experiment. (*The Nikkei Business Daily: January 5, 2012, the Shizuoka Shimbun: January 6, 2012*)

(2) Toyota and Honda

Toyota and Honda revealed their intention at the current North American Auto Show to enter into the US PFV market. While Western Majors and Korean Majors are catching up in the environmental technology, Japan Major aims to take a lead in putting PHV, the strong favorite as the next generation eco car, into practical use to comeback in sales in the US market. Toyota plans to sell 15,000 units in a year in the same market, in addition to launching “Prius PHV”, which is now taking orders in Japan, in the US this spring. Toyota also revealed “NS4”, a new concept car of PHV, on 10th, which is on the way to commercialization at around 2015. This car is going to be equipped with latest technology to enhance the safety and conformability: a camera & radar to detect any risk of an accident to work break automatically, and solar panel on the roof to use the electricity for air-conditioner. Honda, on the other hand, is going to make PHV-type “Accord”, the flagship of Honda, and start local production within the year. Reportedly, it can run 24 km at most only by electricity. (*The Yomiuri Shimbun, the Nikkei: January 11, 2012*)

(3) Nisshimbo

Nisshinbo HD is going to accelerate the product & usage development of electric double layer capacitor for adoption to cars such as HEV and CV. The company will set the most important target on automotive application, and aims to operate at full capacity within 4 or 5 years. The company’s double layer capacitor “N, sCAP” is originally developed ion liquid that was adapted as electrolyte, high in power density and low in internal resistance, and can be used in a wide temperature range. The company has

also embarked on a research and development of hydrogen storage materials using graphite as well as a new catalysis of platinum alternative. Furthermore, as for carbon materials, the company is working on research & development of “carbon alloy catalyst” as an alternative to the platinum catalyst. It aims to realize an early commercialization, putting an axis to co-development with auto manufactures. (*The Chemical Daily: January 12, 2012*)

(4) Osaka Sangyo University

A FCV developed by students of Osaka Sangyo University was disclosed to public at Kasumigaseki on January 13th. It has already obtained a license plate to run on the public roads. The university has been studying on the utility of FC and its hydrogen generation capacity. As the result of their study, the students assembled the FCV using commercial components at the extracurricular hours. It is a two-seater sports utility vehicle, with 7.5 kW of battery and a maximum speed of 80 km/h. It is devised to generate electricity while running. (*The Yomiuri Shimbun, the Mainichi Newspapers: January 14, 2012*)

(5) New possibility of EV

In the wake of the East Japan Great Earthquake, EV has been getting attention for its new role. This is because expectations are increasing for its utility as a storage battery, other than just as a vehicle, which is capable of supplying electricity just in case of emergency or power failure. Auto manufactures, jointly with housing manufactures, have been accelerating the research & development of the next generation eco house “Smart House”, which is expanding the possibility of EV. (*The Yomiuri Shimbun, the Denki Shimbun: January 16, 2012*)

(6) Development of small-sized FC and business development

Aquafairy (Kyoto City) has succeeded in developing a small-sized PEFC that can run a personal computer for more than 20 consecutive hours. It has a box-like shape, 20cm x 35 cm, and uses polymer for the electrolyte membrane. The device is that, when the switch is on, water runs into the bottle of hydrogen generating agent to generate hydrogen which reacts with oxygen to generate electricity, and when the switch is off, the inner pressure of the bottle heightens to stop the supply of the water automatically. The

other type, developed by the company and on the market since last April, cannot stop the reaction of hydrogen generating agent with water in the middle. But this new model is devised to generate hydrogen whenever necessary to generate high-power electricity for a longer time of period. The company expects the usage mainly in time of disasters and power failure. Nominal price is about 100,000 yen/unit, and the company plans to put it on the market from spring 2012 targeting at private companies and local communities. (*The Nikkei: December 26, 2011*)

6. Development of hydrogen generation and purification techniques:

Researchers in industry, academia and government, such as Tonami Transportation Co., Ltd. and Toyama University, have developed a power generation technology utilizing aluminum waste with the support from the Technology Development Measures Against Global Warming Project sponsored by Ministry of Environment, and conducted a demonstration experiment in front of the prefectural office on January 10th. This system generates electricity by firstly reacting aluminum removed from the waste with sodium hydroxide in order to generate hydrogen to be used for FC. This development would be beneficial for reuse of aluminum waste, which amounts to 3 million tons in a year all over the country, and would be commercialized by about two years later and spread across the country in the future. (*Kitanippon Shimbun: January 11, 2012*)

7. Development and business expansion of hydrogen- and FC-related measurement & observation equipment:

(1) SII Nano Technology

SII Nano Technology, a subsidiary of Seiko Instruments (SI), has developed an inspection instrument “SEA-Hybrid” to identify the elements by fast-detecting small metallic foreign bodies, 20 μm in sizes, which mix into the electrode of LiB and FC, and has started selling. The company aims to expand the sales target to manufactures of battery and materials to the extent of 200,000 units/year sales in 2012. Getting mixed up with metallic foreign bodies into the electrode materials or separator of the battery would not only reduce the battery capacity or life but also

cause the overheated fire. (*The Chemical Daily: December 21, 2011, Nikkan Jidosha Shimbun: December 24, 2011, Dempa Shimbun Daily: January 6, 2012*)

(2) Kuramoto Seisakusho

Kuramoto Seisakusho has succeeded in developing a highly sensible gas sensors using organic field effect transistor (organic FET) in collaboration with Okayama University, NARD Institute and Tohoku University. It is characterized by the room temperature testing and the simultaneous measurement of oxygen, humidity and hydrogen. The chip is small in size, a few mm, which makes flexible design possible. The company plans to terminate the development stage by March 2012 and moves onto the commercialization stage of FC and a gas alarm. (*The Chemical Daily: December 21, 2011*)

8. FC-related auxiliaries development and business operation:

Tabuchi Electric Co., Ltd. is going to build the demonstrational next-generation energy-saving housing in the factory with an aim to expand power conditioner business. The company is going to embark on the experiment from this spring introducing solar cells and batteries of several manufactures. It also plans to make the power interchange between houses to experiment the efficiency of their products. Of note, the demonstration houses are going to be equipped with FC and EV as well as LED lamp and power measurement display device. (*The Nikkei Business Daily: January 4, 2012*)

9. Research & development organization and movement of business reorganization:

(1) Kyusyu University

Kyusyu University announced on December 21th that it would establish the next-generation FC Industry-Academia Collaborative Research Center in Ito campus in January 2012. It will work on more sophisticated FC, provide technical guidance to companies, and do assessment and analysis on newly developed FC. The next-generation FC uses a solid oxide for electrolyte, and enhances energy efficiency up to 45 – 60%. About 10 related companies will participates in the research center, promote basic study and technology development in the existing

facility for the time being, and work on durability and evaluation of the industry products developed by companies. Project cost is approximately 1.66 billion yen. (*The Nishinippon Shimbun*: December 22, 2011, *the Nikkei Business Daily*: January 4, 2012)

(2) Panasonic

Panasonic announced on December 27th that it would integrate the research & development departments of Panasonic and its umbrella subsidiary companies, Sanyo and Panasonic Electric Works, into one organization according to their drastic restructuring on January 1st, and focus on the priority areas. They will newly establish “The Next-Generation Energy Device Development Center” in the top priority area, and accelerate the next-generation solar battery development. In addition, they will rename “Panasonic Living Environment Development Center” as “Energy Conversion System Development Center”, and work on the system development in the area of environmental energy including FC. (*The Mainichi Newspapers*: December 28, 2011)

— This edition is made up as of January 16, 2012 —

A POSTER COLUMN

Make 100 times the amount of electricity generated by solar cells:

Group Leader Fukada of National Institute for Materials Science (NIMS) has developed a newly-structured solar battery which makes 100 times the amount of electricity generated by silicon solar battery. It has a structure of myriads of silicon-material micro-rods lined up as a pinholder on the surface of the battery, increasing the area under the sunshine. Assuming that the amount of power generation was stable at a certain level, a 5 m square battery on the roof would become less than 50 cm in size if the surface of the solar battery could be made 1/100 times. Where to install is very flexible. Maintenance is easy. Commercialization 5 years later is aimed at.

On the surface of the new battery, rod-like silicons, 90 nm in diameter and 5 μm in length, stand at intervals of 100 nm. Reportedly, these structures have made it possible to convert more than 600 nm wavelength of

light into electricity, which had been wasted away up until now.

On the calculation, the amount of power generation has become 100 times as compared to the existing structure of the same area, which is made up of the stacks of flat silicon material. If a small solar battery could generate a certain amount of electricity, it would be of wide use, such as building in a device for tracking the direction of the sun. (*The Nikkei*: January 16, 2012)