

# **LIGHT METAL AGE**

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# The 43<sup>rd</sup> Tokyo Motor Show: Shaping a New Future

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The 43<sup>rd</sup> Tokyo Motor Show, which took place from November 20-December 1, 2013 at the Tokyo Big Sight exhibition center, once again presented new products and innovations from domestic and international automakers. A total of 178 companies from 12 countries around the world participated in the event and showcased 181 brands. Passenger cars on display included 76 world premiere models with 81 Japan premiere models. The number of visitors increased 7% from the previous show held in 2011, reaching a total of 902,800. The number of media attending from Japan and abroad was 10,300, exceeding by 10% the 9,400 media representatives that came to the previous show. This increase in visitors and media proves the high level of interest in the show, which strongly promoted the strength of Japanese manufacturing to both Japan and the world.

Under the show's theme, "Compete! And shape a new future," automakers showcased mainly environmentally friendly cars equipped with future-oriented new technologies. These included hydrogen fuel cell vehicles (FCVs), plug-in hybrid vehicles (PHVs), electric vehicles (EVs), and one- to two-seater next-generation mobility. A highlight of the show was the sense of competition between automakers over which car would gain recognition as the ultimate eco-friendly car, such as FCVs and EVs. Eco-friendly cars, emphasizing fuel efficiency, were a focus of the 2011 Tokyo Motor Show, but at the 2013 event, in addition to eco-friendly vehicles, many sports cars and mini-sport-utility vehicles were on display, stressing design and driving performance as their primary characteristics. In the background was a note of concern over the growing tendency among young people in Japan to not want to own cars, and a sense of urgency could be seen among automakers who would like to put the brakes on this trend.

## *Eye-Catching Cars*

The FCV Concept was designed as a next-generation hydrogen fuel cell vehicle that Toyota Motor plans to bring to market in 2015 (Figure 1). The concept has an exclusive sedan-type body, under which the in-house developed small, lightweight fuel cell (FC) stack and two 70 MPa high-pressure hydrogen tanks are installed (Figure 2). Output is more than 100 kW and practical driving range is more than 500 km. It takes about three minutes to refuel hydrogen fully, which is close to the time required for gasoline vehicles. Furthermore, when the hydrogen tanks are fully fueled, the vehicle is capable of supplying 10 kWh of power to an average Japanese home for over a week.

Nissan Motor has been concentrating extensively on EVs and exhibited a number of them at the show. The company developed its New Mobility Concept by focusing on social concerns, such as the increase in the number of elderly and single households. The company also focused on the actual use of vehicles designed for short driving distances with few passengers. The New Mobility Concept is a two-seater car, with one seat in the front and another in the back (Figure 3). Another feature of the car is that it takes approximately four hours to charge with a standard 200 V charge. In addition, it has a cruising range of about 100 km and travels at a maximum speed of about 80 km/h. Since October 2013, social demonstration tests are being carried out



Figure 1. Toyota's FCV concept is a next generation hydrogen fuel cell vehicle.

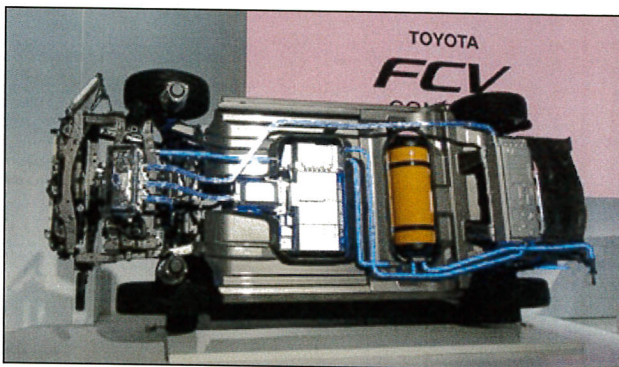


Figure 2. Underside of the Toyota FCV.

in the city of Yokohama. The tests are based on a rental system and Nissan has provided 50 cars, which are only used in Yokohama.

Honda Motor unveiled the NSX concept vehicle, which has a direct-injected V6 engine, mounted amid-ship (Figure 4). The highly efficient, high output hybrid power system from the Sport Hybrid SH-AWD is installed on the NSX model and is environmentally friendly, while at the same time offering a sports car like driving experience. Honda stopped the production of the original NSX in 2005. Although it had an all-aluminum monocoque body at the time, the decision has not been made on the material to be used for the new NSX to be put on the market in 2015.



Figure 3. Nissan's New Mobility Concept vehicle.





Figure 4. Honda's NSX concept vehicle.

Mitsubishi Motors exhibited the concept XR-PHEV (Figure 5), a next-generation compact SUV that uses a newly developed front engine, with a front wheel drive layout plug-in hybrid EV system (PHEV system). The company mounted the engine and motor in the front of the car to reduce power loss and achieve higher eco-friendliness and driving performance. With the PHEV system, the vehicle basically travels on electric motor power while the engine provides both power and drive. Depending on driving conditions and remaining battery power, the vehicle automatically selects an optimum drive mode (either EV Drive Mode, Series Hybrid Mode, or Parallel Hybrid Mode), which also improves agility and eco-friendliness. As the concept car is equipped with a large-capacity battery, set at power source 100 V AC (1,500 W), it can supply a standard household with power to meet its requirements for almost one day. If power generated from the engine is included, the car is capable of supplying a standard household with power for almost ten days.



Figure 5. Mitsubishi's XR-PHEV concept vehicle.

#### *Changes in Demand for Aluminum Products from the Japanese Auto Industry*

Japan's auto production suffered a downturn after Lehman Brothers collapsed in 2008 and another blow in 2011 after the great East Japan earthquake struck, both resulting in a downturn in automotive production and demand. Domestic auto production in 2012 totaled 9.944 million units, falling sharply by 14.3% from the 11.596 million units produced in 2007 before the Lehman Shock occurred. During 2013, year-to-date September data shows that domestic auto production fell to 7.126 million units, 7.2% lower from the same period a year earlier. Production improved slightly in the July-September quarter by 1.3% to 2.465 million units year-on-year. Japan has to some extent built up a stable market despite the ups and downs in the demand for au-

	Passenger Cars	Trucks	Buses	Total
2007	9,944	1,538	114	11,596
2010	8,311	1,209	109	9,629
2011	7,159	1,136	104	8,399
2012	8,555	1,266	122	9,943
Change Y-on-Y	119.50%	111.40%	117.30%	118.40%

Table I. Auto production in Japan (in 1,000 units).

tomobiles in the country. However, automakers are steadily moving their production abroad and decline in domestic output will be unavoidable. Japanese automotive production is shown in Table I.

Changes in the domestic demand for aluminum products for auto applications are reflected in the production results previously discussed. In 2012, total demand for aluminum by the auto industry increased 9.1% year-on-year to 1,596,423 tons. Compared to the result for 2007 (one year before the Lehman Shock), when demand reached 1,774,482 tons, the volume was 10% lower for 2012. Table II shows aluminum product shipments in Japan from automotive during 2007-2012.

			2007	2011	2012	Change Y-on-Y
Rolled & Extruded Products	Wheels		4,388	2,061	1,762	85.5%
	Motorcycles		13,488	7,442	6,922	93.0%
	Passenger Cars		124,595	106,835	117,124	109.6%
	Trucks & Buses		29,396	26,914	30,150	112.0%
	Heat Exchangers		153,844	117,522	123,491	105.1%
	Subtotal		325,711	260,774	279,449	107.2%
	(Rolled)		(166,527)	(134,204)	(143,498)	(106.9%)
	(Extruded)		(159,184)	(126,570)	(135,951)	(107.4%)
Castings & Die Castings	Castings		397,619	358,996	396,179	110.4%
	Die Castings	Motorcycles	51,069	33,362	32,486	97.4%
		Passenger Cars	936,669	780,694	859,141	110.0%
	Subtotal		1,385,357	1,173,055	1,287,806	109.8%
Forgings			33,414	29,793	29,168	97.9%
Total			1,774,482	1,463,622	1,596,423	109.10%

Table II. Aluminum product shipments for automobile applications in Japan (in tons).

Composition ratio of aluminum products used in the auto industry has not changed significantly over the last several years. Although it had been expected that demand for rolled and extruded products would grow in the auto sector, composition ratio of the two products has fallen from 18.4% in 2007 to 17.5% in 2012. Demand for aluminum from the auto industry is expected to increase in the future due to the growing need for weight reduction in cars. However, Japan cannot hope to see domestic auto production rise sharply and the major issue will be how the country will develop its strategy based on the technologies it has already developed in order to deal with expanding auto production overseas.



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