

Special Feature: Development of Environmentally Friendly and Comfortable Commercial Electric Vehicles



Hino Motors' Environmental Technologies

Development of Environmentally Friendly and Comfortable Commercial Electric Vehicles

- Initiative to Introduce Small-Sized Electric Buses -

On February 29, 2012, Hino Motors delivered a small-sized electric bus it developed to Keisei Bus Co., Ltd. and the city of Hamura, respectively. This marked the first time for electric buses produced by a domestic commercial vehicle manufacturer to be adopted for public bus transportation in Japan. Keisei Bus is using the small-sized bus, nicknamed "Sumirin-chan," for a route in Tokyo's Sumida Ward, mainly in the area near the new Tokyo Skytree (broadcast tower). In Hamura, the vehicle is being promoted as "Hamura's electric bus" on a new community bus route. Both vehicles operate seven times per day.



"Sumirin-chan,"



"Hamura's electric bus"

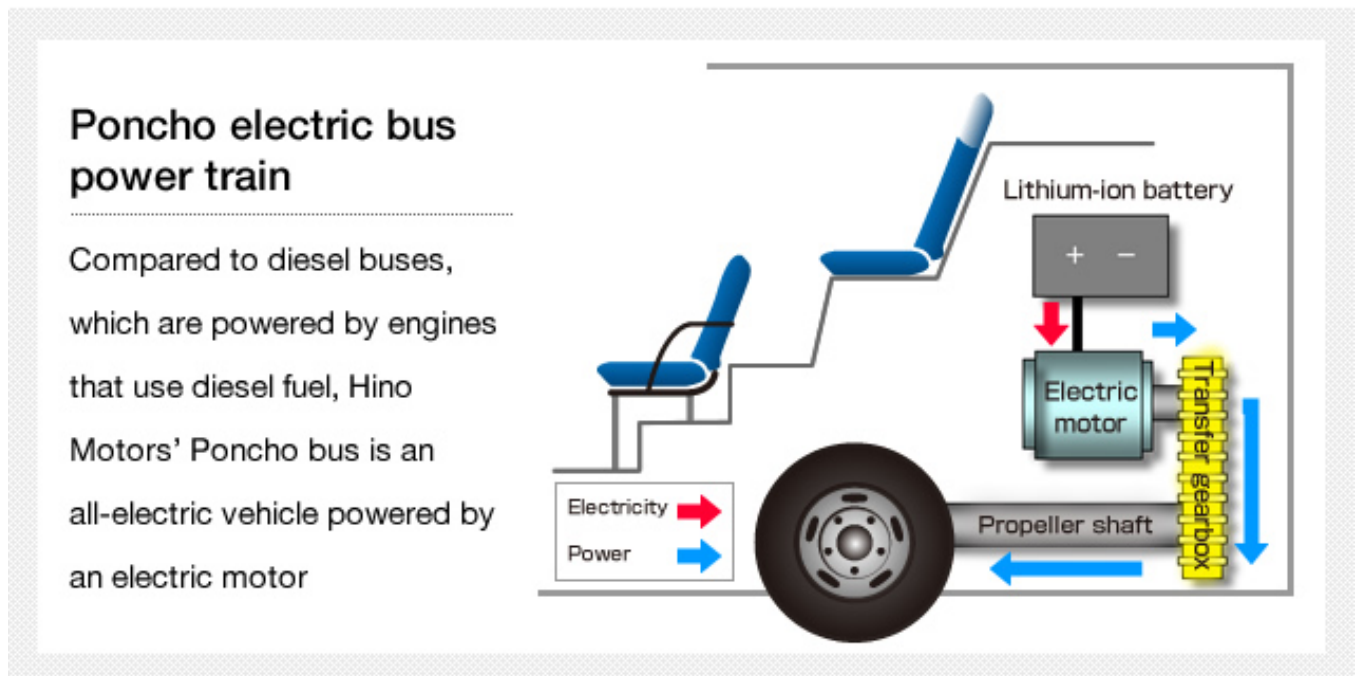
Shifting Electric Vehicle Development from Passenger Cars to Commercial Vehicles

Manufacturing the hybrid electric vehicle (HEV) or electric vehicle (EV) has been recognized as an urgent issue in recent years as part of efforts to address global warming. Development in this field has progressed for passenger cars in particular, the advancement of which took place over a relatively short term. Following this trend, Hino Motors believes that commercial vehicles are expected to be next in line in the shift to HEVs and Evs. Hino Motors-as one of forerunners in commercial-use HEV development-strived to respond to this trend in 2008 by assembling a project team of engineers in electric drive system technologies and launching the development of an electric bus based on its small-sized Poncho bus model.

Challenges for a Commercial, Small-sized Electric Bus

With the aim to develop Japan's first small-sized electric bus for public bus transportation, the project team explored new technologies. For the vehicle to be commercially viable, the major technological challenge involved producing a battery that is efficient in size, weight and cost. In this regard, the team adopted a concept of short-distance driving and high-frequency charging under which the team strived to design a battery that would be as light as possible, yet have an extended lifespan.

Looking ahead, Hino Motors intends to enhance the battery's energy density and charging and discharging performance, reduce bus weight, and enhance the vehicle's power train performance. As its next challenge, Hino Motors will strive to develop a diesel hybrid bus capable of traveling even longer distances between charging. The Company will endeavor to achieve this goal based on its leading research and development as well as experience in commercializing vehicles, as demonstrated by its light-duty trucks equipped with the Hybrid Inverter-controlled Motor & Retarder system and collaboration with valued business partners that manufacture equipment and parts such as batteries, motors, and auxiliary engines.



■Environmental performance of the Poncho electric bus compared to diesel buses

Nox	Emits 99% less NOx
CO₂	Emits 60% less CO ₂
Generates less external noise	70 dB compared to 80 dB mandated for diesel buses when driving at 50km/hr

Producing a Small-sized Electric Bus for Public Transport Routes

Before launching the bus, it was necessary for the team to solve practical issues such as battery and charger compatibility and the effect of heating or air-conditioning use on the bus' travel distance. Although data covering these issues for the passenger cars has been compiled, no data was available for small-sized buses. In this regard, the team believes that these two deliveries of small-sized electric buses to Keisei Bus Co., Ltd. and the city of Hamura represent the first step in electric commercial vehicle development.

Hino Motors also displayed a light-duty electric van as a concept commercial EV model at the 42nd Tokyo Motor Show in 2011. The Company will continue to contribute to society in the future by further developing an array of environmental technologies, as one of the pioneers of commercial EVs, for various types of hybrid and electric commercial vehicles.



Customer feedback

A message from Yoshiaki Asami, representative of the Hamura City Hall department in charge of traffic safety and disaster and crime prevention

We widely raised the profile of Hamura's environmental initiatives with the adoption of Hino Motors' electric bus, which emits no CO². Hamura was the first municipality in Japan to officially operate an electric bus for public transportation, and we hope that this initiative will trigger a widespread movement to employ the vehicles nationwide.

Thanks to the Poncho electric bus, which began operations from March 10 this year, the city has received a large number of inquiries from around the country regarding electric buses. The degree of interest has been surprising, with officials from many municipalities coming to inspect the Poncho.

Passengers commented on how surprisingly quiet it is inside and how comfortable the ride is. Some people have also mentioned that the battery usage display is very interesting.

A message from a Hino Motors electric bus driver

Electric buses are raising expectations as clean-energy vehicles for the next generation, so we have been able to greatly promote the company's environmental initiatives by using the vehicle.

Passengers riding on the Poncho EV have complimented us on its quiet ride compared to diesel buses and the smooth acceleration.

Employee Comments

Vehicle Design Department
Yoshiaki Shinkura and Toshitake Okano

**Working for the future of EVs
as a global manufacturer
of environmentally friendly
commercial vehicles**



Due to the major earthquake that struck Japan, orders for two Poncho electric buses were finalized only in the second half of fiscal 2011. After that, we proceeded swiftly from the confirmation of the vehicle specifications, usage conditions and manufacturing to preparation and assistance for various undertakings, including an application for the pertinent governmental subsidy as the first electric buses to be used for public transportation. We believe that this experience can be put to good use in further developing and launching commercial electric vehicles.

The environmentally friendly image of electric cars on the market appears to have had an influence on the spreading social trend toward EV adoption. However, it is challenging to produce commercial EVs that meet with the demanding driving and safety conditions. We are making efforts to inform our customers about these strict factors and pursue commercial EV development in the future.