

HONDA'S ACTIVITIES FOR HYDROGEN SOCIETY

Koji Nakazawa

Honda R&D Co., Ltd. R&D Center X

Summary

In order to reduce carbon dioxide (CO₂) emissions and reduce dependence on fossil fuels, Honda has been developing fuel cell vehicles (FCVs), which use hydrogen as their energy source and discharge only water while driving.

The newly developed FCV, the CLARITY FUEL CELL, has evolved to provide new era appeal together with the same usability as a vehicle with an internal combustion engine. The fuel cell powertrain is mounted under the front hood, realizing the world's first FCV to be commercially available in a five-passenger sedan package. The key technologies in this achievement are the greater compactness and shock-resistant construction of the fuel cell stack, the adoption of an electric turbo air compressor and fuel cell voltage control unit, and the compact drive unit. Optimal placement of the hydrogen tank and increased pressure capacity extend the driving range to approximately 750 km, and achieve a hydrogen refueling time of about three minutes. Driving performance is also heightened by pursuing reductions in vehicle body weight and enhancement in its aerodynamic performance, through increased power of the motor, and so on. These efforts have realized a level of usability on a par with vehicles running on internal combustion engines.

If the compressed hydrogen can be conveniently and efficiently made from renewable energy, it would both stimulate the popularization of FCVs and help to resolve environmental issues. Given these points, Honda is researching methods of hydrogen production concurrently with vehicle development.

An all-in-one smart hydrogen station has been developed, using Honda's original high differential pressure water electrolysis technology. The key components are packaged to be the size of a ten-foot container, reducing footprint and simplifying installation work. In addition, an interface was created to be easily understandable for those having no hydrogen refueling experience. In terms of performance, the pure water production method was revised to reduce water consumption to less than one tenth of the previous method. In addition, high-pressure water discharge technology was developed to increase the durability of the hydrogen production system. Furthermore, in order to expand the installable area to include semi-cold regions, heater functionality was added, preventing function loss from freezing. With these changes, smart hydrogen stations are being introduced by municipalities and private parties around Japan as an effective approach for achieving a hydrogen society and for promoting popularization of FCVs.