

# A Smooth Ride to the Future

*Some new Tokyo buses make a powerful statement that the city is serious about its commitment to being an environmentally friendly city.*

If passengers on the bus route between Tokyo Station and the Tokyo Big Sight convention center find their ride particularly quiet and far smoother than expected, they can thank a technology that may just be the future of inner-city surface transportation: hydrogen-powered fuel cell buses. Introduced on the route earlier this year, the buses are the first of an eventual fleet of 100 environmentally friendly fuel cell buses (FC buses) that Tokyo hopes to have in operation by 2020. They are part of the city's strategy to contribute to a "hydrogen society."

The buses run on hydrogen, which is stored in high-pressure tanks onboard and fed to fuel cell batteries where a chemical reaction occurs between the hydrogen and oxygen, creating electricity that powers the bus in a safe and eco-friendly fashion. Because the only by-product from this innovative process is water, the buses produce no greenhouse-effect-causing CO<sub>2</sub> or other polluting emissions. The buses are capable of traveling up to about 200 kilometers before needing to be refueled in a quick process.

The elimination of an internal combustion engine offers even more benefits for passengers. Not only are the running and operation nearly silent, but the ride is fluid and virtually jolt-free, thanks to the absence of the clunky gear changes required for combustion engines.

The buses, which currently cover the 8.5 kilometers from the station to the convention center in about

40 minutes, are an important achievement in Tokyo's ongoing transition to a "smart energy city." The public response has been overwhelmingly positive, with people contacting officials to rave about the comfortable, quiet ride and the reasonable fare, which is the same as for other city bus routes.

The buses are also designed to serve an important function in the event of natural disasters, such as earthquakes. With a capacity of 235 kilowatt hours, or enough energy to power the average home for nearly two weeks, the buses can be used as power sources at evacuation centers using special connections, ensuring electricity at times when it is needed most.

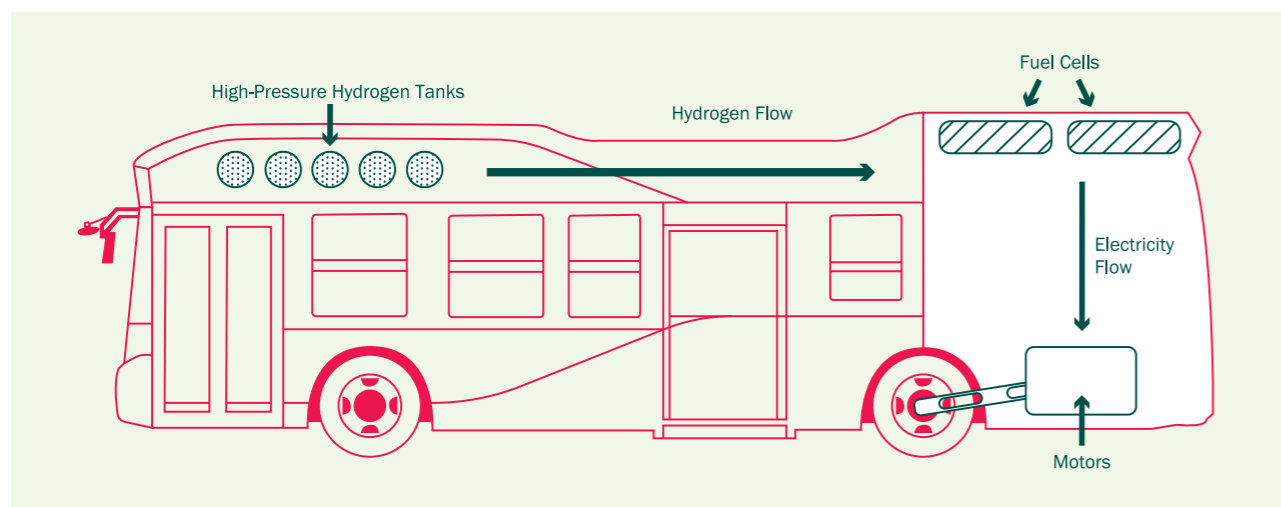
Although the production cost of these hydrogen-powered fuel cell buses is still very expensive, the cost is expected to come down as they go into mass-production.

Hydrogen offers the benefit of being able to be produced from various sources, including oil, water, by-product gases and woody biomass, which helps to ensure that the city and the country will have access to a constant and secure energy supply. As the Japanese hydrogen processing industry continues to evolve as one of the best in the world, there is great growth potential in exporting this technology, as demand for green energy is expected to grow globally.

In addition to the buses, the Tokyo Metropolitan Government plans to increase the number of hydrogen-fueling stations, which are critical to support the



One of the city's eco-friendly FC buses runs smoothly past Tokyo's Kabukiza Theatre.



The power system of a fuel cell-powered bus.

spread of FCVs among the general public. Tokyo expects to have 35 stations ready in 2020, and 150 installed by 2030.

The city is also promoting the wider use of renewable energy, encouraging people and organizations to increase usage. As of 2015, renewables accounted for about 11 percent of the energy consumed in Tokyo, but the government hopes to have 15 percent of all energy used in the city come from renewable sources by 2020, and 30 percent in 2030.

Tokyo hopes to achieve these targets by taking advantage of the many corporate and residential rooftops in the city as locations for solar panels, and

having consumers buy energy from companies producing renewable energy outside the city. Such initiatives also help create momentum for green energy activities throughout Japan.

Tokyo's future will very likely be a green one. Given all the projects under way, the city is certainly on the path to creating a greener future and becoming a model of a smart energy city. For now, a few buses in central Tokyo are doing their part in drawing attention to the benefits of a world in which hydrogen FCVs eliminate noxious emissions while transporting people in quiet comfort.