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In a changing business environment, Showa Shell is seeking sustainable growth as an energy company through an array of R&D activities. Our R&D efforts include the development of high value-added products to comply with customer needs and environmental concerns in mind, as well as technologies for next-generation energy sources and joint development with external research institutions.

R&D Activities

1. Oil-related fields

Showa Shell is engaged in R&D to provide the energy of the future. Alongside sales of *Shell Eco Toyu*, a specialized fuel for oil-based fan heaters made from GTL (Gas to Liquids), a new fuel synthesized from natural gas, we are conducting public road trials of a commuter bus for Company employees that runs on 100% GTL fuel and of similarly fueled city buses operated by the Tokyo Metropolitan Government's Bureau of Transportation. Showa Shell is also taking part in a project for the introduction of biodiesel fuel conducted by the Japan Petroleum Energy Center. Furthermore, steps are underway to commercialize high-quality, high-performance lubricants for automotive and industrial applications, grease and bitumen as part of our ongoing pursuit of environmental and energy-saving performance.

2. Environment-related fields

Showa Shell continues to amass technologies and expertise with respect to soil environments by conducting surveys of the soil environment around oil refineries, depots, service stations, and other oil industry facilities, and carrying out research related to technologies for analysis and evaluation and remediation.

3. New technology fields

Showa Shell's participation in the Japan Hydrogen and Fuel Cell Demonstration Project sponsored by the Ministry of Economy, Trade and Industry is not only building our expertise in technologies for supplying hydrogen to fuel cell vehicles, but also in safety management and maintenance of equipment and systems. We are also involved in trial testing of residential fuel cell systems fueled by LPG through participation in a fuel cell demonstration project sponsored by the New Energy and Industrial Technology Development Organization (NEDO).

Cooperative Framework With the Shell Group

Our Central Research Laboratory in Kanagawa Prefecture, is one of the Shell Group's research bases. Here, we engage in research and development, taking advantage of the expertise of the Shell Group's globe-spanning network centered on petroleum-related fields. Through exchanges in human resources and information sharing among Group research centers in countries such as Great Britain, the United States, the Netherlands, and Germany, we endeavor to secure the most appropriate human resources and the latest technology.



Central Research Laboratory

Ariake Hydrogen Station Supplies Its 3,000th Vehicle

Expectations for hydrogen are high as an extremely clean energy. Showa Shell, in conjunction with Iwatani Corporation, operates the JHFC Ariake Hydrogen Station (Koto Ward, Tokyo) for supplying fuel cell and hydrogen-powered vehicles with automotive-grade hydrogen. On March 23, 2009, the Ariake Hydrogen Station supplied its 3,000th vehicle, an unprecedented milestone for a stand-alone hydrogen station in Japan. Fill-ups at the station to date have amounted to some 6,000kg of hydrogen; enough fuel for a fuel cell or hydrogen-powered vehicle to travel around the world about 15 times.

After nearly six years of demonstration testing, the completion of 3,000 fill-ups without a single accident or injury can be considered a major accomplishment in advancing the eventual commercialization of hydrogen stations. We will continue efforts to bring such stations into practical use in the future by accumulating business expertise to operate stations safely and consistently.



JHFC Ariake Hydrogen Station

GTL Demonstration Testing

GTL is an environmentally friendly liquid fuel synthesized from natural gas that is virtually free from sulfur or aromatics. The Shell Group currently operates the world's first GTL plant in Malaysia, and Showa Shell is using this GTL in a wide range of initiatives.

For one year through to the end of March 2009, we used the Central Research Laboratory's employee commuter bus to conduct public road trials using 100% GTL diesel oil. With technology support from the manufacturer of the bus, Toyota Motor Corporation, and its seller, Hino Motors Ltd., we successfully demonstrated that GTL fuel remains useable and problem-free under different ambient temperatures and other environmental changes.

Furthermore, since February 1, 2009, we have been supplying GTL as a FTD (Fischer-Tropsch Diesel) fuel for the FTD fuel road trials underway by the Tokyo Metropolitan Government, Toyota Motor Corporation and Hino Motors Ltd. These road tests are being conducted as part of EFV21, a project for developing and promoting the commercialization of next-generation low emission vehicles. The project is centered on the National Traffic Safety and Environmental Laboratory, an independent administrative institution, under commission from Japan's Ministry of Land, Infrastructure, Transport and Tourism. Showa Shell is scheduled to supply 100% GTL fuel for two route buses (state-of-the-art hybrid buses) operated by the Tokyo Metropolitan Government's Bureau of Transportation, in a one-year test project to demonstrate an effective model for low-carbon traffic and transportation in major cities.



GTL plant in Malaysia



State-of-the-art hybrid buses of the Tokyo Metropolitan Government's Bureau of Transportation