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Discarded Hydrogen Vehicles Reborn as Hydrogen Generators and Rare Earth Resources

- MCEE launches technology development for dismantling, reuse, and recycling with an investment of KRW 40.8 billion

The Ministry of Climate, Energy and Environment (MCEE, Minister Kim Sungwhan) and the Korea Environmental Industry & Technology Institute (President Nam Kwang Woo) announced that they will officially launch a national research and development (R&D) project in June to safely dismantle end-of-life hydrogen vehicles and reuse and recycle their key components.

This project is being promoted to safely dismantle end-of-life hydrogen vehicles, which are expected to increase in the future as the supply of eco-friendly vehicles expands, and to establish a circular utilization system that can reuse high-value core components such as hydrogen storage tanks, fuel cells, and drive motors.

Hydrogen vehicles include special components such as high-pressure hydrogen storage tanks, requiring safe dismantling and specialized reuse and recycling technologies at the end-of-life vehicle stage. In particular, key components of hydrogen vehicles, such as fuel cell stacks and drive motors, have high reuse value and contain large amounts of critical minerals such as rare earth elements and platinum, making it necessary to proactively establish a system for their circular use after vehicle disposal.

Accordingly, the MCEE will invest a total of KRW 40.8 billion from 2026 to 2029 to promote technology development in three key areas: safe removal of residual hydrogen and dismantling of core components; development of a power generation system for reuse of hydrogen storage tanks and fuel cells; and recovery of permanent magnets from end-of-life drive motors and their conversion into eco-friendly high-purity rare earth materials.

First, residual hydrogen remaining in the hydrogen storage tank is safely removed, and performance evaluation technologies are developed to assess the condition of key core components installed in hydrogen vehicles, such as fuel cell stacks, hydrogen storage tanks, and drive motors, to determine whether they can be reused or recycled.

In addition, fuel cell stacks and hydrogen storage containers that still have remaining service life will be supported for the development and demonstration of reuse technologies so they can be used as power generation systems at construction sites, island regions, ships, and other locations.

Furthermore, an eco-friendly technology is developed that can automatically dismantle and separate rare-earth permanent magnets in hydrogen or electric vehicle drive motors, which were difficult to disassemble due to their complex structure, and recycle rare earth elements at high purity from the recovered permanent magnets.

The MCEE plans through this technology development to build a foundation for a circular economy across all stages after vehicle disposal, from safe dismantling of end-of-life hydrogen vehicles to reuse of key components and recovery of rare earths. In particular, it is expected that securing rare earths from end-of-life drive motors, whose volume is expected to increase in the future, will reduce dependence on overseas sources of critical minerals and contribute to strengthening resource security.

Kim Go-eung, Director General for Resources Circulation Bureau at the MCEE, stated, “End-of-life hydrogen vehicles are future resources containing key materials such as fuel cells and rare earth permanent magnets.” He added, “We will actively support the entire technology development process so that this R&D achievement can be applied in the field and expanded into the reuse and recycling industry.”