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Domestic Ultra Pure Water Demonstration Plant Technology Transferred to Private Sector

- Ultra pure water produced and utilized with domestic technology in semiconductor processes, strengthening the foundation for supply chain independence

The Ministry of Climate, Energy and Environment (MCEE, Minister Kim Sungwhan) announced that it will hold a performance utilization agreement ceremony on May 19 at the SK siltron Gumi Plant (located in Gumi, Gyeongsangbuk-do) for the transfer of technology for an ultra pure water demonstration plant, a deliverable of the “Localization Technology Development Project for High-Purity Industrial Water (Ultra pure water) Production.”

Ultra pure water* is water from which impurities have been removed to trace levels and is an essential process water used to clean contaminants from semiconductor surfaces.

* The concentration of ionic substances in the water is controlled to 1 ppt (one part per trillion) or lower, and the concentration of gases such as dissolved oxygen is maintained at 1 ppb (one part per billion) or lower.

This water is an essential foundational resource across advanced industries in Korea, including semiconductors, displays, secondary batteries, and biotechnology; however, because it requires highly advanced water treatment technology, production technologies have long been led by overseas companies in countries such as Japan and the United States.

To reduce reliance on such technologies and strengthen the competitiveness of Korea's water industry, the MCEE has been promoting a project to localize ultra pure water production technology since 2021.

The ultra pure water demonstration plant, to which domestic technologies were applied throughout the entire process of design, construction, and operation, was installed at the SK siltron Gumi Plant, the end user, to verify its performance.

Major equipment and materials developed by domestic companies were applied to key processes in ultra pure water production, including organic matter removal (UV oxidation system), dissolved oxygen removal (degassing membrane), and ion removal and water quality enhancement (ion exchange resin), thereby securing long-term operational performance records.

The ultra pure water produced through this technology transfer will be supplied to the semiconductor wafer* production process at the SK siltron Gumi Plant. This marks the first case in which ultra pure water produced using domestic design technology is supplied to an actual semiconductor manufacturing process, making it highly significant in that it enables domestic companies to secure field application records and lays the groundwork for entry into the ultra pure water market.

* A thin circular silicon plate used to manufacture semiconductor chips and electronic circuits; as a core semiconductor material, it requires ultra pure industrial water in which even trace-level impurities are strictly controlled.

In addition, this achievement is expected to strengthen supply chain stability in the ultra pure water sector, which has long relied on overseas technologies, while also contributing to the enhancement of domestic water companies' technological competitiveness and the expansion of the industrial ecosystem.

In addition, the MCEE is also promoting the localization of the entire ultra pure water production process and the development of source water diversification technologies through the production of ultra pure water based on wastewater reuse in order to proactively respond to industrial water shortages caused by the climate

crisis and establish a stable ultra pure water supply system.

Kim Ji-young, Director General for Water Use Policy Bureau at the MCEE, stated, “This technology transfer is a significant achievement that goes beyond the localization of ultra pure water technology and leads to its actual application in industrial settings.” She added, “Large-scale investments in advanced industries such as semiconductors will contribute to the development of Korea’s domestic water industry, including the ultra pure water sector.”