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# Applying Intelligent Technology to Dam Management: Establishment of the First Dam Management Master Plan

- Establishing a dam management system utilizing Fourth Industrial Revolution technologies such as AI and digital twin
- Developing advanced industrial water supply solutions utilizing the reservoir of Hwacheon dam (hydroelectric power generation dam)

The Ministry of Environment (Minister Han Wha-jin) announced that the ‘First Dam Management Master Plan (2024-2033)’ (hereinafter referred to as ‘master plan’) outlining the policy direction for dam management was deliberated and approved at the National Water Resources Management Committee (Vice Minister Lim Sang-jun as Chairman) on February 23.

This master plan is a 10-year strategic plan for dam management, the first of its kind since the amendment of the Act on Construction and Management of Dams and Assistance To Their Environs (hereinafter referred to as Dam Construction and Management Act) in June 2021. It includes measures to enhance the value and benefits of dams, such as stable and efficient dam operation and management in the era of climate crisis, as well as the revitalization of areas surrounding dams.

\*According to Article 4 of the Act on Construction and Management of Dams and Assistance To Their Environs, it outlines the basic policy of dam management, facility management plans, dam reservoir operation, water environment conservation plans, and conservation measures for areas surrounding dams.

The dams subject to the application of the master plan are those with a hei

ght of 15 meters or more, including dams as defined in Article 3 of the Dam Construction and Management Act (dams constructed by the Minister of Environment, mayors or governors of cities and provinces, mayors of cities, county executives, and K-Water) and power generation dams as stipulated in Article 4 of the Electric Power Source Development Promotion Act. In total, 150 dams\* fall under this category.

\* (Ministry of Environment) Includes 20 multipurpose dams, 14 dams for domestic and industrial water supply, and 3 dams for flood control. (Local governments) Consist of 92 dams for domestic and industrial water supply. (Ministry of Trade, Industry and Energy) Includes 21 dams for power generation.

The key contents of the master plan are set under the vision of ‘Safe Dams Benefiting Everyone,’ with three major goals: 1) Safe dams responding to climate change, 2) Smart dams based on intelligent technology, and 3) Dams that coexist harmoniously with humans and nature. The implementation strategies include: a) Dam operation and management responding to climate and social changes, b) Safe and sustainable dam facility management, c) Dam water environment conservation ensuring water use for future generations, d) Enhancement of dam value in collaboration with local communities, and e) Promotion strategies for strengthening the competitiveness of power generation dams for securing sustainable renewable energy.

In particular, the plan includes innovations in dam operation and management systems to ensure safety during natural disasters such as extreme floods and earthquakes. This involves the establishment of a precise monitoring system for dams based on advanced technologies such as digital twin, artificial intelligence (AI), and drones. Additionally, there is a focus on satellite-based monitoring of rivers shared between North and South Korea for the safety management of dams and waterways in border areas, aligning with the Fourth Industrial Revolution era.

Moreover, the plan includes measures such as developing water supply soluti

ons for advanced industrial complexes utilizing the reservoir of the Hwacheon Dam, which is a hydroelectric power generation dam. It also encompasses the exploration of specialized projects in areas around dams to enhance local income and job creation, as well as the promotion of a collaborative approach with the region, including the development of a cluster for Gangwon Province's hydroenergy.

To ensure the effective implementation of the initially established master plan, dam administrators such as K-Water, local governments, and the Korea Hydro & Nuclear Power Co., Ltd. are required to formulate specific and executable detailed implementation plans for dam management for their respective dams, in accordance with Article 4-2 of the Dam Construction and Management Act.

Kim Gu-beom, Director General of Water Resources Policy Bureau at the Ministry of Environment, stated, "With the establishment of the First Dam Management Master Plan, we aim to proactively respond to water disasters such as floods and droughts through efficient dam operation and management. Additionally, we will build a safety management system based on science, including the utilization of Fourth Industrial Revolution technologies, to ensure that the public can have confidence in dam facility management."