



Ministry of Land, Infrastructure and Transport

Release Date: FOR IMMEDIATE RELEASE

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Homepage: <http://www.molit.go.kr/english/intro.do>

A new way of recovering and recycling waste

A new urban resource recovery plant gives Korea an integrated waste-to-energy plant model and a pathway to carbon neutrality.

The Ministry of Land, Infrastructure and Transport of Korea (MOLIT) and the Korea Agency for Infrastructure Technology Development (KAIA) developed an integrated template for processing urban wastes and recycling the resulting biomass for power generation.

Technologies underpinning the plant were developed as part of the MOLIT R&D program from June 2016 to November 2020. The project, which included both the technological development and pilot operation for verification, was public-private collaboration: A consortium of 12 entities led by the Institute for Advanced Engineering and involving private-sector companies like GS E&C provided the funding for (Out of 12.9billion KRW, the government paid 9.5billionKRW with the rest coming from the private-sector) and participated in the project.

What's worth noting about the project is that it made two great achievements with no outside help. First, most of the technologies that went into building key facilities of the plant (ei, hydrothermal carbonization, drying and incineration) were domestic. Second, the pilot operation was also run by Korean experts, which will ensure operational independence after the plant's introduction. More importantly, the plant will facilitate Korea's transition to a decentralized energy supply system and low-carbon economy.

So far, different types of urban wastes are processed in dedicated treatment facilities, which are often located separately from one another. Such a dispersed treatment system increases the overall costs due to lack of scale and generates complaints from local residents due in large part to the foul smell from the facilities.

The urban resource recovery plant can address these issues by centralizing waste collection and treatment. Moreover, power generation from the resulting biomass will contribute to local electricity supply.

To verify its potential, a prototype facility for pilot operation was created inside the metropolitan landfill site in Incheon. Wastes like domestic waste, food waste, and sewage sludge were transported to the landfill for treatment and conversion into electricity at the site, which was then supplied to a nearby gulf club. The pilot operation continued for about a month from October to November 2020.

Based on the pilot operation results, expected annual savings on electricity bill can reach 330million KRW. Reduction in waste treatment costs by shifting to a more integrated system can be as much as 30% compared to the system in operation now.

If the template is applied to a larger scale involving 7000 households, 22.6 ton-daily wastes from the households(Domestic waste: 14tons, Food waste: 4.8 tons, Sewer sludge 3.8 tons), can generate enough

electricity to make 550 households energy self-sufficient while cutting CO2 emissions by 2466 tons per year.

Lee Sang-joo, Director General for Construction Technology of MOLIT says, “The urban resource recovery plant will enable local cities to build integrated waste management centers and run them safely and efficiently. We can also consider utilizing the underground space to house power generation facilities and leave the surface area for communities.”

He also added, “Given the potential, I believe the plant model will be actively considered in future urban projects in Korea, like new town or smart city development as well as urban renewal. Its appeal will also give boost to Korea's competitiveness in the overseas construction market.”