Technological development for resource recovery and recycling in urban wastewater and waste treatment systems

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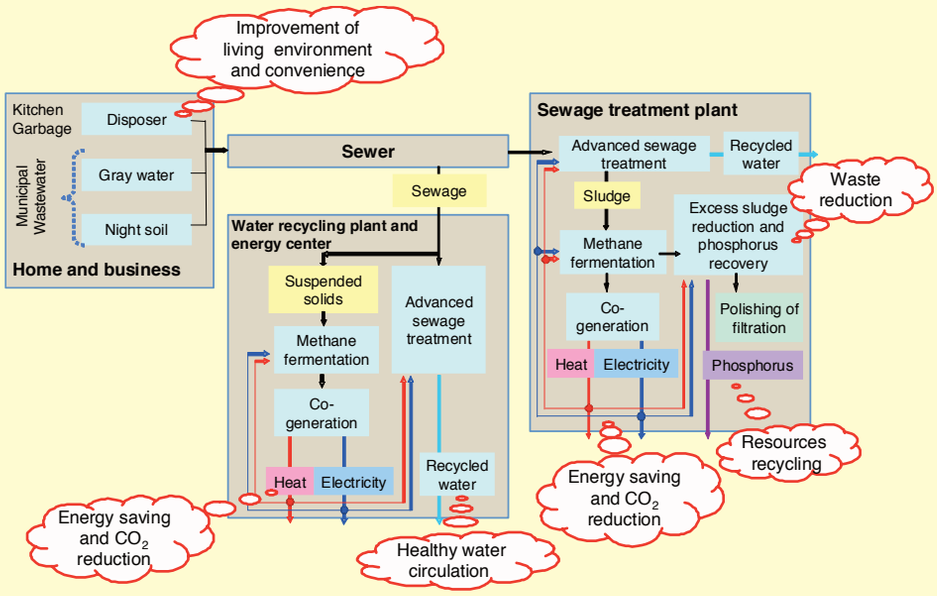
We are developing component technologies with the goal of establishing a unified treatment system for the resource and material resource recycling of wastewater and waste in urban areas. In the system we envision that kitchen garbage is passed through a garbage disposer and enters the sewer, and then the suspended solids will be collected and used to generate energy by methane fermentation. Meanwhile, usable water will be produced from sewage to support the regional water cycle. The system will create energy from primary sedimentation sludge at the sewage treatment plant, while reducing excess sludge and recovering phosphorus. This system is expected to reduce the amount of energy consumed in the transportation of wet waste; to provide an improved living environment and greater convenience by eliminating wet waste; to generate electricity, heat, and water resources; to recover phosphorus, which will become depleted in the future; to save energy and solve the problem of land for treatment plants by reducing the volume of sludge production; and to create new industries. In addition to reducing carbon dioxide emissions, it is expected to contribute greatly to sustainability and an improved regional environment.

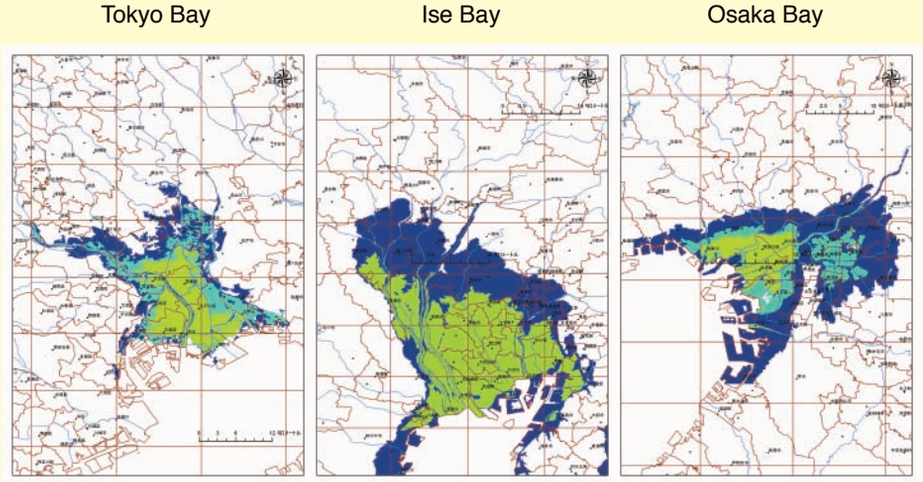


Proposal of a new municipal waste and wastewater management system for improvement of global and local environment
(Hiroshi TSUNO, Professor, Kyoto University)

Risk of inundation in Japan's coastal cities due to rising sea levels:

Predicted areas of flooding with higher sea levels at Tokyo Bay, Ise Bay, and Osaka Bay

The figure below shows the areas around Tokyo Bay, Ise Bay, and Osaka Bay which are expected to be flooded. These areas are shown in three colors, indicating the areas which experience flooding at the current sea level (yellow-green), areas which would be flooded with a 59-centimeter rise in sea level (light blue), and areas which would be flooded when taking historic record storm surges into consideration (dark blue). This is an indication of the potential for flooding without coastal and harbor structures such as revetments, because such structures are not taken into consideration in these predictions. For example, the coastal area around Tokyo Bay which lies below the current high-tide sea level is 117 square kilometers, but the potential area of flooding is 204 square kilometers at a higher sea level, or 322 square kilometers if historic record storm surges are taken into consideration. The population affected by flooding would increase from 2.32 million at present to 3.233 million or 4.156 million, respectively (2000 national census). In coastal areas that are being protected by structural means, including these three major bay coasts, the indicated areas of flooding are not so much a prediction of damage as an expression of the potential benefits of structural protection.



Maps by Yuji KUWAHARA, Department of Urban and Civil Engineering, Ibaraki University

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