B-16 Evaluation of Sewage and Waste Disposal System to Control Global Warming Gases

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1) The emission factors for CH_4 and CO_2 in wastewater treatment facilities using standard activate sludge process were estimated to be 90-320, and 40-80mg/day/person, respectively, and those in pig farm wastewater treatment facilities using anaerobic-aerobic recycling system were to be 135 and 277g/day/capital, respectively.
2) The study of feasibility of digestion gas generation systems revealed that it could only be done at a sewage treatment plant that processes an average of at least 40000m^3 of wastewater per day, and that the venture would only provide real profits at plants with a capacity of 60000m^3/day or more. As a result of a study of the feasibility of using digestion gas as city gas, it was concluded that the digestion gas could not be used by itself.
3) Water level controlling in the landfill site is important for the active production of CH_4 and its recovery. Recycling of the leachate water in the landfill site is also effective for the active gas production. By using this system, it was estimated that 30Mm^3 of CH_4 are emitted from 100m*100m*21m landfill site, and this amount was estimated to be economically enough for the electric power generation system.
4) To reduce N_2O emitted from wastewater treatment, it was thought that installation of anaerobic condition as intermittent aeration into the ordinal aerobic wastewater treatment process such as standard activated sludge process was effective.
5) Life-cycle of several kinds of beverage containers were examined and energies consumed during whole their life-cycle was analyzed for deriving better way of their recycling. With respect to PET beverage bottles and PSP food trays, possible alternatives for their recycling were described and evaluated in terms of energy consumption and saving. The life-cycle energy analysis was also carried out concerning an incineration facilities for municipal waste with power generation plant to balance its account of life-cycle energy and carbon dioxide
6) A prototype design support system has been developed as software framework. This support system is based on customizing technique for a CAD system and communication technique between different processes. An early-stage design process of material selection for a car body is demonstrated by solving the formulated relation between weight reduction and strength as an example. This design process is guided by an investigated and proposed design strategy which is based on finding and resolving trade-off problem in various criteria. Preliminary structural design process has been also incorporated into the developed system.