

# Overview of devices for energy recycle from waste

HARAMURA, Yoshihiko

*Kanagawa University, Japan*

## **Abstract:**

First, the amount of resources of waste is discussed. Industrial waste, about 80% of total, mainly consists of sludge (45%), excreta (20%) and building waste (15%). As to waste from general activities, flammable waste occupies about 60%. Human waste can be carbonated to burn. Some examples are presented for energy recycle.

Second, the characteristics of combustion gas of waste are discussed. Since radical substances such as hydrogen chloride attack the material of heat exchangers at high temperature, wall temperature is restricted lower than 320°C.

Finally, possible energy conversion systems are discussed, including steam power plants Stirling engines and thermoelectric devices. Each of them has available power range for good performance and cost. The possibilities and problems to be concerned are discussed.

## **Keywords:**

Stirling engine, Steam power plant, Thermoelectric device, Energy Recycling, Waste Heat