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Food waste collection and recycling for renewable biogas fuel production in Hong Kong

To tackle the food waste issue in Hong Kong, a framework of food waste collection and recycling for food waste valorization is proposed. The framework consists of a simple food waste separation and collection process involving less behavioral change of residents and food waste recycling for renewable biogas fuel production. Food waste can be packed in an optic bag (i.e., green bag), while the residual municipal solid waste (MSW) can be packed in a common plastic bag. All the wastes are then sent to the refuse transfer stations, in which food waste is separated from the residual MSW using an optic sensor. The optic sensor can achieve a separation efficiency of food waste and residual MSW as high as 98%. The collected food waste is then sent to the proposed Organic Waste Treatment Facilities for biogas production via anaerobic digestion technology. The biogas (with methane content of 50-70% by volume) can be upgraded using water scrubbing technology and valorized as a biogas fuel for vehicle use (with methane content of 98% by volume). The application of biogas vehicle fuel from food waste has been widely adopted by some countries such as Sweden, Norway, and France. By converting 1,080 tonnes per day of food waste into biogas fuel as a petrol substitute for vehicle use in Hong Kong, it is estimated to fuel around 12,000 passenger cars per day, equivalent to about 2.6% of registered passenger cars in Hong Kong. In addition, it reduces about 1.9% of greenhouse gas (GHG) emissions in the transport sector. This percentage reduction is higher than the percentage reduction of GHG emissions for the transport sector in Hong Kong in 2010 with reference to the year 2005.

Biography

Irene M C LO is currently a full Professor in the Department of Civil and Environmental Engineering at the Hong Kong University of Science and Technology. She is an elected Academician of the European Academy of Sciences and Arts, Fellow of the Hong Kong Institution of Engineers, and Fellow of the American Society of Civil Engineers. She received her PhD degree in Civil (Environmental) Engineering from the University of Texas at Austin in 1992. She has held 2 patents, edited 7 technical books, and published over 260 SCI journal articles and conference papers with citations about 4500 and H-index of 35.

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