

Waste to Energy Project Co-fermentation of organic waste and septage for energy production in Nashik

Introduction

Within the framework of the “International Climate Initiative” of the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, Germany (BMUB) GIZ is supporting Nashik Municipal Corporation in implementation of an innovative “Waste to Energy” project in the city. The objective of this project is to produce clean energy by using the energy content of wastewater/sludge and organic waste in Nashik. The methane generated will be utilized for the production of electricity through a combined heat and power plant. The proposed innovative technology involves co-fermentation of the organic degradable part of municipal solid waste and fresh black water from toilets. It is done by using a high rate bio-digester. The output of gas in this innovative technology is high as compared to traditional bi-methanation processes used in the country.

The Waste to Energy project in Nashik is being implemented in cooperation with Nashik Municipal Corporation (NMC). Out of the considered project areas Delhi, Raipur and Nashik, the city of Nashik offers the best conditions for project implementation due to the availability of input material flows (organic waste from hotels and septage from toilet complexes) and their utilization as well as the existing infrastructure. NMC is ready to make provisions for utilization of energy produced by feeding it into the state power grid.

Objectives

The main objective of this pilot project is to demonstrate the innovative concept of combined treatment of black water and organic solid waste (co-fermentation) for generation of renewable energy. The process is organized in a sustainable manner with particular focus on the complete value chain of the combined waste and wastewater (close the loop approach) while developing a sound business and operational model. The International Climate Initiative (IKI) of the Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, Germany (BMUB) forms the framework of the considerations with the objectives mentioned in the figure 1.

Approach

The approach of this project is a participatory process of converting waste to energy. The participatory process ensures involvement of all stakeholders - NMC, public representatives, hotel industry, technical experts and engineers. The project involves construction of a waste-to-energy plant which will consume food and vegetable waste from 1300 restaurants and hotels, as well as black water collected from about 400 community toilets in Nashik. In total it would consume between 10 to 15 tonnes of organic waste and 10 to 20 tonnes of septage each day. The plant will be installed at a site adjacent to the existing Municipal Solid Waste Management

Project name	Waste to Energy Project
Commissioned by	Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, Germany (BMUB)
Country	India
Leading Executing Agencies	Ministry of Environment and Forest (MoEF), Government of India, Nashik Municipal Corporation, Nashik Maharashtra, India
Overall term	2010 to 2015

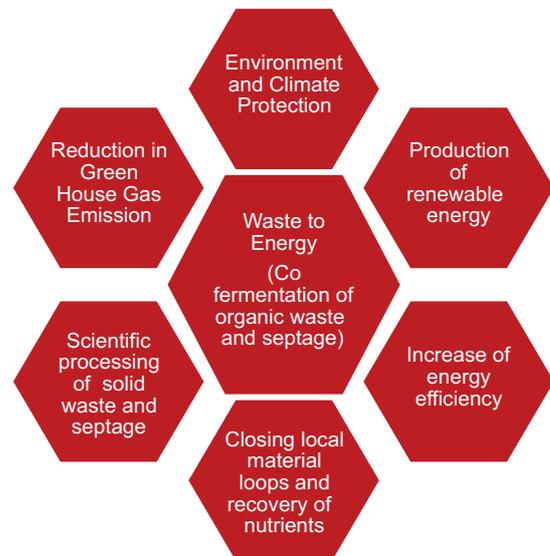


Figure 1: Objectives of the project

(MSW) plant in Nashik. The facility would include two combined heat and power plants of 200 kW_e and 60kW_e. The system being used in Nashik follows the principle of 'HAMBURG WATER Cycle[®]', which was first developed by the Hamburg Water and Sewerage utility of the city of Hamburg in Germany, called Hamburg Wasser. The system recovers material and generates energy outputs from the flows of organic substances in the city. One of the main characteristics of the system is the co-fermentation of black water with waste biomass to produce energy using a high-rate bio-digester. The methane generated would be utilised for the production of electricity in a combined heat and power plant.

Excess heat would also be used to pre-heat and condition the incoming waste water, thus accelerating the digestion process of the waste mixture. The hygienically safe and nutrient-rich effluent that results from the process can be used as a moisturizing agent in the composting process in the existing compost plant, thus closing the loop of recycling and reusing waste.

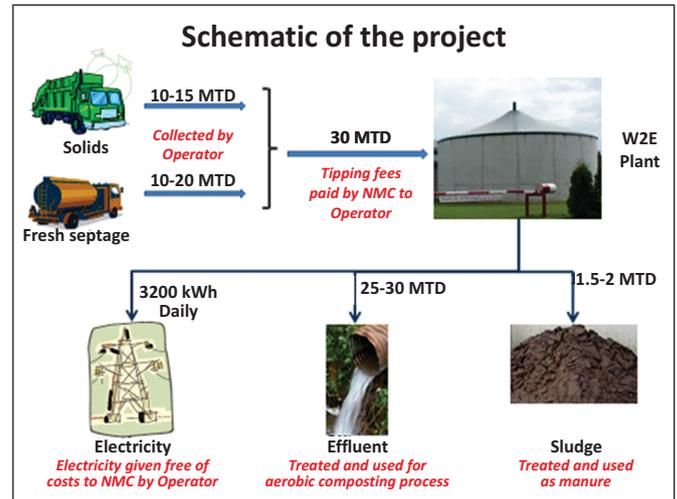
The technology provider Hamburg Wasser estimates that the system will yield about 2,100 cubic meters of biogas each day, with

which it expects to generate up to 3,200kWh of electricity on a daily basis.

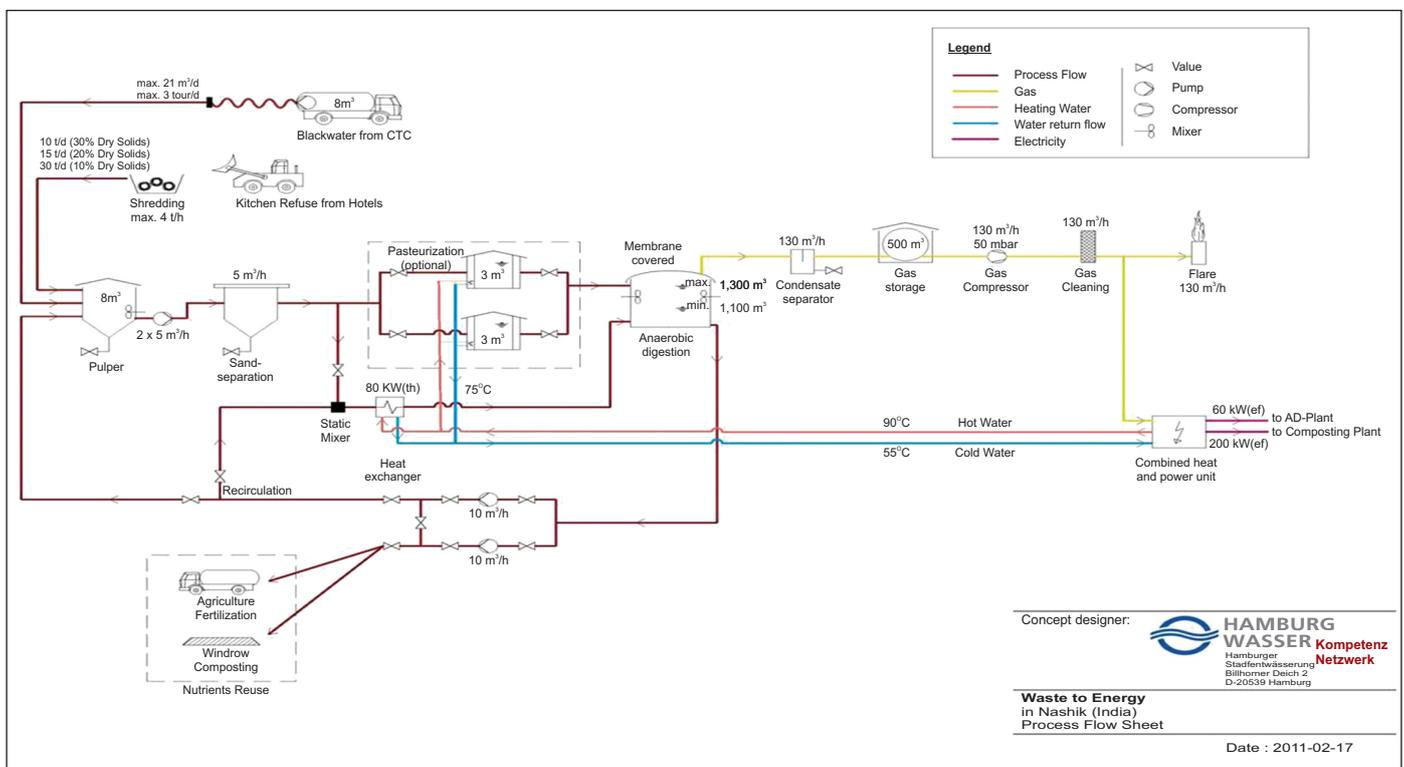
Expected Result

A pilot plant for demonstrating the innovative technology of co-fermentation will be developed as a model for demonstration. This decentralized approach of converting waste into energy for fast growing cities offers following advantages:

- Safe treatment and disposal of nearly 10-15 MTD* of degradable waste along with about 10-20 MTD of septage from community toilets, which are currently not handled safely
- Prevention of uncontrolled methane emissions and energy production from waste after treatment
- Reduction of energy cost of Nashik Municipal Corporation due to the expected revenue inflow from feeding the produced electricity into the power grid of the Maharashtra Electricity Board
- Avoid organic waste going into the landfills



implemented through Public Private Partnership (PPP). The planning & implementation concept will be documented at every step. The PPP approach opens possibilities to develop and replicate sustainable WtE** plants throughout India in order to reduce



Waste to Energy Project - Process Flow Diagram

- Enhanced public service delivery by NMC incorporating climate change concerns
- Nutrient recovery

Further steps

The Nashik Municipal Corporation has requested bids for the pilot plant through a competitive bidding process. The project will be

investment costs for the public sector and to achieve sustainability in operation through "fair" contract arrangements. Closed loop cycles are creating additional benefits when it comes to carbon footprint and resource efficiency, which for countries like India as a rising economic power is of highest importance. The innovative pilot project is in the line with Government of India's endeavour to encourage WtE projects for urban waste.

*MTD – Metric Tonnes per Day
**WtE – Waste to Energy