An overview of 'Clean Development Projects (CDM)'

Waste Management with Anaerobic Treatment

Anaerobic technology for solid wastes treatment and sewage is not new in India. It was demonstrated as early as 1989 with a full-scale plant treating 5 MLD of sewage. It was followed with another plant of 14-MLD capacity at Kanpur. Several other plants are in pipeline. Apart from the good old septic tanks, the 'Indore method' of composting is an early example. Current stringent discharge norms and the rising energy costs with conventional aerobic treatment systems is stimulating interest in anaerobic treatment. Energy audits favour this technology owing to its potential for energy savings and potential for energy recovery. Thus anaerobic technology falls under 'Clean Development Projects' (CDM). Tapping methane, one of the green house gases, emitted during the anaerobic reaction of either solid or liquid wastes falls under CDM project activity. Every tonne of Carbon dioxide emission reduction, that would have otherwise got emitted, qualifies the technology under the CDM project activity. The warm Indian climate is especially favourable. It and will aid the process efficiency

Paradoxically, despite it's huge potential, it has not enjoyed the patronage it truly deserves; except for biogas generation from cow dung. The primary obstacle appears to be a fundamental lack of knowledge. Lack of understanding of the process and ways to handle and control occasional upsets that may occur are probably hampering wider application.Anaerobic process was often associated with bad odours, overloaded conditions, design failure and operational disasters, dreaded by operators. All that has changed now with the first successful 'Up-flow Anaerobic Sludge Blanket' (UASB) reactor built in Kanpur under the Indo-Dutch project. The UASB deals with the whole wastewater, not just the sludge. Anaerobic technologies have their place in wastewater treatment

Domestic wastewater (sewage) contains organic and inorganic matter in suspended, colloidal and dissolved form. The concentration in the wastewater depends on the water supply and the uses to which it has been put. The climate and the life-style of the people have a marked effect on the wastewater characteristics. The presence of industrial wastes in public sewers can substantially alter the nature of the wastewater. Wastewater characteristics vary not only from city to city but also from season to season and even hour to hour within a given city.

A typical arrangement of a UASB type treatment plant for municipal sewage will be.:

1. Initial pumping from collection well
2. Screening and gritting
3. Main UASB reactor
4. Gas collection and conversion or conveyance (optional)
5. Sludge drying beds
6. Post treatment facility (optional, depending upon final discharge standards)

In the UASB process, the whole waste (not just the sludge) passes through the anaerobic reactor in an up-flow mode, with a hydraulic retention time (HRT) of only about 8-10 hrs average. No prior settling required. The anaerobic treatment unit does not require stones or media; The up-flow sewage itself forms millions of small "granules" or particles of sludge held in suspension, providing a large surface area on which organic matter attach and undergo degradation. A high solid retention time (SRT) 30 - 40 or more days occurs within the unit. No mixers or aerators; conserves energy. Very low operating costs are an attractive bonus

You can collect and use the gas produced. Anaerobic systems function satisfactorily with indoor temperatures of 18-20-C, making it ideal for most parts of India. Periodically the excess sludge has to be drained via a separate pipe. The excess sludge goes to a simple sand bed for drying. The process conserves nitrogen & phosphorus, making it viable and valuable to use the treated effluent for irrigation

Only part of the biogas formed in the UASB is available for energy purposes, rest stays dissolved in the wastewater and passes out with the effluent. Theoretically, gas produced at 25-C and 1-atm = 0.38-cum / kg of COD removed. However, effective gas production may be only 0.1 to 0.3-cum / kg of COD removed. Biogas has about 70-80% methane content. In energy terms, 1.0-cum biogas with 75% methane content is equivalent to 1.4 Kwh electricity

Anaerobic treatments of sewage qualify under CDM project activity. Highly polluting countries offer subsidy to developing countries to meet their emission cap. Users have an opportunity to bring down the green house gases (CHG) with the anaerobic technology. Low-energy consuming treatments, substantial reduce the amount of CO^2 emission from the thermal power plants, making great ecological sense