

SEWAGE TREATMENT PLANT

At present the sewage generated in Chennai city is being treated in the following nine number of treatment plants:

Sl. No	Location	Capacity (Million Litres per Day)
1	Kodungaiyur STP Zone - I	80
2	Kodungaiyur STP Zone - II	80
3	Kodungaiyur (New) STP Zone I & II	110
4	Villivakkam STP Zone - II	5
5	Koyambedu STP Zone - III	34
6	Koyambedu (New) STP Zone - III	60
7	Nesapakkam STP Zone - IV	23
8	Nesapakkam (New) STP Zone - IV	40
9	Perungudi STP Zone - V	54
Total Capacity		486 MLD

Four Nos. of STPs were constructed between 1974 and 1991 viz. Nesapakkam (23 MLD), Koyambedu (34 MLD) and Kodungaiyur I & II (80 MLD + 80 MLD). The treatment process adopted in all the four STPs was the Activated Sludge Process (ASP). Apart from this, one No. of Aerated Lagoon (5 MLD) was constructed at Villivakkam by TNHB and subsequently taken over by the CMWSS Board. At the time of the formation of CMWSSB in 1978, the secondary treated effluent from all the STPs were partially used for cultivation of Paragrass which was auctioned every year. It fetched some marginal revenue to the CMWSSB. The remaining treated sewage was discharged to the nearby water courses. From 1993 onwards, after the commissioning of the Kodungaiyur S.T.P, the



CMWSSB started supplying secondary treated sewage to the nearby industries in Manali Town. The industries having their own tertiary treatment plants / RO plants for further polishing for their usage in the cooling water and for process purposes.

Four new STPs were constructed under the Chennai City River Conservation Project (C.C.R.C.P) and were commissioned during 2005 and 2006, at Kodungaiyur (110 MLD), Koyambedu (60 MLD), Nesapakkam (40 MLD) and Perungudi (54 MLD) and the total addition to the treatment capacity was 264 MLD. In these new STPs new technology in sludge treatment and generation of power using bio-gas were adopted which significantly reduces electricity import from the State Electricity grid.

CHARACTERISTIC OF RAW SEWAGE

B.O.D₅ @ 20°C : 350 – 380 mg/L

T.S.S. : 400 – 450 mg/L

Feecal Coliform : 15 lakhs to 28 lakhs MPN / 100mL



TREATMENT PROCESS

PRIMARY TREATMENT



Screening

Degriting

Clarification

SECONDARY TREATMENT



Aeration

Clarification

Disinfection

SLUDGE TREATMENT



Thickening

Anaerobic digestion

Dewatering of sludge

QUALITY OF TREATED SEWAGE

BO D₅ @ 20°C : less than 20 mg/L

TSS : less than 30 mg/L

Feecal Coliform : less than 10000 MPN / 100 mL



REUSE OF SECONDARY TREATED SEWAGE

From Kodungaiyur STP, the secondary treated sewage is being supplied to the following Industries at the rate of Rs.8.75 per kilo litre.

Chennai Petroleum Corporation Ltd (CPCL) : 23.0 MLD

Madras Fertilizer Ltd (MFL) : 11.5 MLD

Manali Petro Chemicals (MPL) : 1.5 MLD

Total : 36.0 MLD



Revenue of about Rs.10 crores is being generated per year through the sale of secondary treated sewage to the industries.

About 3.0 lakhs litres per day of secondary treated sewage is supplied to the Chennai Municipal Corporation for watering of plants and lawns at public parks and traffic islands, at free of cost.

UTILISATION OF BIO-GAS FOR POWER GENERATION

As a sustainable solution to confront the ever rising energy costs and to combat the environmentally damaging Green House Gases, the Bio-Gas generated from the sewage sludge is being used as fuel for generation of electric power. All the four new STPs are generating power using Methane content of the Bio-Gas and are self-supporting without any need for additional power from the electricity grid.

Bio-gas is a by-product of anaerobic digestion of sludge. Normally Bio-gas is composed of 60% to 65% Methane and 25 to 30% Carbon-di-Oxide with a trace amount of other gases. Methane has energy value but is one of the green house gases responsible for global warming. The bio-gas is a resource, converted to Non-Conventional Energy (Green Power), after purification.



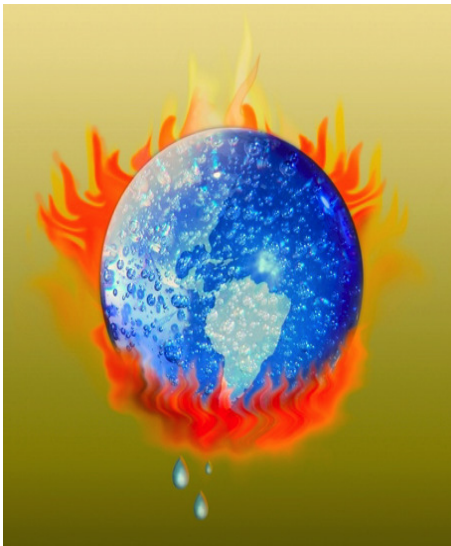
NON CONVENTIONAL ENERGY PRODUCTION (GREEN POWER) IN 4 STPs

Location of STP	Capacity (MLD)	Capacity Of Gas Engine (KW)	Power production per month (KWh)	Cost savings / month @ Rs.3.50 / KWh
Kodungaiyur (Zone - I&II)	110	1064	4,50,000	15.75 Lakhs
Koyambedu (Zone - III)	60	625	2,25,000	7.90 Lakhs
Nesapakkam (Zone – IV)	40	469	1,50,000	5.25 Lakhs
Perungudi (Zone – V)	54	1064	3,60,000	12.60 Lakhs
Total	264	3222	11,85,000	41.50 Lakhs

The average electrical energy production from bio-gas is about 2 KWh / m³ of bio-gas. Energy cost savings through power production per year is 373.50 lakhs (9 months / year).

CLEAN DEVELOPMENT MECHANISM (CDM)

The potential to reduce the emission of GHGs and the associated prospect of Carbon Credits through the CDM, encouraged CMWSSB to incorporate the methane capture and power generation components into the design of new STPs. All the four new STPs have now incorporated facilities for methane capture and gas based power generation as already explained which is expected to significantly reduce the GHG emissions. The utilisation of bio gas for power production causes reduction in



emission of Methane, one of the GHG, into the atmosphere. As per the Kyoto Protocol, all the four new STPs are eligible for Carbon Fund under the CDM for the reduction of GHG. CMWSSB has submitted documents to the Ministry of Environment and Forests (MoEF), Govt of India and obtained Host Country Approval. This CDM project is under validation. After validation this

project has to be registered with the United Nations Framework Convention on Climate Change (UNFCCC), the authorised body for issuing Carbon Credit.