Common Effluent Treatment Plant (CETP) as a practical solution for Waste Water Treatment in Industrial clusters

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Industrial effluent discharge
Industrial effluent treatment plant
How much treatment is enough?
Answers that are attempted:

- Why CETPs?
- Are the CETPs able to deliver intended results?
- Challenges of the Indian CETPs?
- What GIZ is doing to overcome the challenges?
- Way Forward?
WHY CETPs?
WHY CETPs?

- More than 300,000 SSIs spread in 900 clusters
- SSIs contribute 40% of the total industrial output of the country
- Provisions under Water Act, 1974
- Difficult for the SSIs units to install and operate effluent treatment plant at individual level.
- About 1/6th of the discharge by SSIs presently being treated in CETPs.
CETPs for SSIs

CETP - A **co-operative movement** for water pollution control with an objective of

- **Wastewater treatment and conservation**
- **To reduce the treatment cost** to be borne
- **Protecting** the water environment
CETPs for SSIs

CETPs Provide an Opportunity for Industrial Promotion by way of:

- **Appropriate pollution abatement** infrastructure
- **Regulating development** around Industrial Estates in an environment-friendly manner
- Contribute towards sustainable development by providing **integrated water & wastewater management system**
Suitability of CETPs

- CETPs are an end-of-pipe technology
- End-of-pipe technologies are known to be the most expensive
- Adoption of clean technologies, and resource recovery programs represent the better alternative to treatment
- CETPs have utility in treating homogenous waste streams
- For heterogeneous streams, the CETPs are really facing challenges
CETPs in India

- Total CETPs in India: 171
- Mostly installed with **Govt. support** (MOEF CETP Scheme, MoC&I (DIPP), MoT Scheme)
- 60% of the CETPs are in the hydraulic capacity range up to 5 mld, 29% in the range >5 to 10 mld, and 11% in the range >20 mld
- Five states - Delhi, Gujarat, Maharashtra, Rajasthan and Tamil Nadu together comprise 78% of CETPs and 87% of the installed CETPs’ hydraulic capacity
State-wise Distribution of CETPs

- West Bengal: 1 CETP
- Uttranchal: 4 CETPs
- Uttar Pradesh: 4 CETPs
- Tamil Nadu: 13 CETPs
- Rajasthan: 4 CETPs
- Punjab: 1 CETP
- Madhya Pradesh: 1 CETP
- Maharashtra: 27 CETPs
- Kerala: 3 CETPs
- Karnataka: 9 CETPs
- J & K: 1 CETP
- Haryana: 11 CETPs
- Gujarat: 27 CETPs
- Delhi: 13 CETPs
- Andhra Pradesh: 6 CETPs
Guidelines for CETPs

- The project should be **self-supporting**
- Formulate adequate **institutional arrangements**
- Possibility of **recycling/reusing** to be explored
- A **legal agreement** between the CETP Co. and its member units.
Key Elements of CETP

Appropriate Technical Models
- Compliance with standards and beyond, Reliability, Cost effectiveness, Recycle/reuse

Appropriate Business Models
- Owner, Operator, Finances etc.

Appropriate Management Models
- Monitoring, User charges, Dealing with defaulters etc.
Key Issues & Challenges
Pertinent Issues with CETPs

- Problems with ownership structures
- Cost overruns
- Management of toxic sludge
- Enforcement of pretreatment requirements
- Procedural delays
Factors influencing planning of CETPs

- **Categories** of effluent generating member industries
- **Fluctuations in quality and quantity** of effluent for homogenization.
- **Pre-treatment** requirement at individual industries level
- Requirement of **segregation** of effluent streams
- **Collection** of effluent (**conveyance** system) and **monitoring** mechanism
- **Treatability** of effluent and selection of treatment technology
- **Mode of disposal** (drain/river/sea/municipal sewer/reuse)
- **Charging system** based on flow and pollutant load.
Key Issues / Concerns: Design related Issues

- **Refractory COD** from chemical industries
- **Right BOD/COD** concentration and flow
- **Poor performance** of primary- and secondary-settling units
- Hazardous and toxic effluents,
- **High TDS** for tanneries, pharmaceutical units, chemicals manufacturing units and dye & dye intermediates units
- Proper monitoring at the inlet and outlet.
- **Overloading**
- Maintenance of operating parameters.
- **Hazardous sludge/waste generated** are issue of concern.
Key Issues / Concerns: Business Management Models

- Ownership - public bodies or private bodies or jointly on public-private partnership.

- Management models as per the well-defined multi-stakeholder roles.

- Location and infrastructure

- Responsibility of CETP operator

- Relationship with owner

- Lack of trained personnel.
Technological Issues: Sludge / Hazardous Waste Disposal

- **Huge** generation of “Primary” and “Secondary” Sludge
- **Inappropriate Sludge Dewatering** Systems – SDB
- **No Bio Sludge Digestion** systems
- **Sludge disposal Fees** at TSDF Sites – 1000 to 2500 Rs./Ton
- Many CETPs **lack infrastructure to separately collect** “Primary” and “Secondary” Sludge
Technology Issues related to ZLD systems

- The Technology adopted for treatment before RO varies
- Major issue has been with evaporation of R.O rejects in thermal evaporators.
- **Steam consumption** is very **high** for MEE
- Technical **limitations in evaporating mixed salts**
- The **mixed salt** is **contaminated** due to concentration of pollutants in the R.O rejects
Technology Issues related to ZLD System

- **Salt cakes** in most cases is **not fit for disposal** to landfills and require hazardous waste disposal facilities.

- **Corrosion and scaling** of the **evaporators** resulting reduced life and efficiency.

- Most CETPs particularly ZLD CETPs are generating several hundred tons/day of **Hazardous solid waste**

- Need to shift from ZLD towards **Zero Waste Plants**.

- Demands extensive **R&D for Zero Waste Plants**
GIZ Initiative
CETP Intervention framework

Focus shifts over the time of project implementation

Development & planning
- Situation analysis/baseline assessment
- Stakeholder consultations/knowledge exchange (national level)
- Pilot selection, strategy design

Implementation & monitoring
- Pilot implementation
- Stakeholder consultations/knowledge exchange (cluster level/state level)

Up-scaling
- Documentation of pilot experience/results
- Stakeholder consultations/knowledge exchange (national level)

Policy integration
- Policy/strategy/guidelines/rules/procedures etc.

Pilot-specific approaches
Generic approaches
GIZ Initiative: Combined Industrial Waste Water Management

Situation Analysis
- Regional and National Stakeholder consultations / workshops
- Preparation of reference document

Demonstration
- Demonstration of retrofitting approach at Vapi CETP and planning of new CETP approach for APSEZ CETP
- At Nacharam Mallapur CETP, effective management model is developed and demonstrated for making the CETP operational

Dissemination
- Training programme for CETPs, Industrial Development corporations and State / Central regulatory authorities
- Training of CETP operators planned through DWA
Source Reduction Demonstration in the Paper and Textile Sector

- Barriers/Issues identified & Solutions Analysed
- Pilots – 11 Identified, 6 implemented, 5 in pipeline
- Training for SPCB and Industries
- Reference document & Knowledge Exchange Platform
EU approach for industrial pollution prevention

Industrial Emissions Directive (IED): the essential requirements

1. Prevention of pollution and, if not feasible, reduction
2. Permit is required for operating the installation
3. Permit needs to contain conditions including emission limit values (ELVs) for all relevant pollutants, which are based on the use of the best available techniques (BAT)

Source: Allen, EC, DG Env, Green Week Brussels 2012

http://eippcb.jrc.es/reference/
Thrust Areas

1. Systematic approach for setting up of CETPs
2. Proper disposal facilities for treated wastewater
3. Skilled manpower for operation and management of CETPs
4. Development of competitive market for CETP services
5. Energy intensive equipment
6. Green public procurement
7. Need for R & D to indigenously develop/ customise technologies
Grant Subsidy for Promotion of CETPs

» Existing grant subsidy – centre: state: proponent – 50:25:25
  (MoEF - ceiling of Rs. 20 crore without ZLD and Rs. 40 crore for projects with provision of ZLD)

» Submission of detailed project report based on a standard approach

» Formation of a SPV (special purpose vehicle) is a must

» SPV should be free from the influence of the industry members
WAY AHEAD
Approach for Planning of New and Retrofitting of CETPs

» Problem analysis

» Identification of alternatives/concepts for wastewater treatment

» Proofing of principles to verify if concepts would work (lab testing)

» Parameter studies

» Assessment of energy, materials and resource consumption

» Comparison of alternatives and arriving at preferred concept

» Pilot tests – undertaking of pilot tests to ascertain the viability of the identified technical solutions

» Pre-basic design of the CETP

Source: J. Pawan et al., BTS, 2014
Focus Areas for Policy Measures

- Grant subsidy for promotion of CETPs
- Promotion of recycle and reuse of treated wastewater
- Facilitation of development of skilled manpower
- Market development for CETPs
- Support for energy efficiency in CETPs
- Promotion of Zero Liquid Discharge
- Promotion of R & D related to CETPs
CONCLUSIONS:

- CETPs are very crucial for SMEs
- **Holistic approach** would help achieving real sustainable results
- Management model should be devoid of **conflict of interest**
- CETP’s should be **strategy ready** for varied quality of influents
- **Technological choice** should take care of the possible adversities.
- **Monitoring** plays a vital role.
- **Lack of awareness** on effective operation and maintenance affects performance.
Thank You

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