



Identifying best available technologies for decentralized wastewater treatment and resource recovery for India

D2.7 Pilot 7 implementation
report



Work Package	Piloting candidates for BATs
Deliverable number	D2.7
Deliverable title	Pilot 7 implementation report
Due Date	M20
Submission Date	29.03.2022
Deliverable Lead Partners	Cambi/IIT Roorkee
Dissemination Level	Public
Document Nature	<input checked="" type="checkbox"/> R-Report <input type="checkbox"/> O-Other
Contributing partners	Cambi, IIT Roorkee
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Version	V01

Table of Contents

1 Context information and overview of the pilot	4
2 Task a: Detailed design and project report	4
3 Task b: Detailed engineering design and construction	5
3 Task c: Commissioning and start of operation	6
4 Task d: Detailed initial research plan for the experimental work.....	Error! Bookmark not defined.

1 Context information and overview of the pilot

A pilot for anaerobic digestion of sewage sludge from wastewater treatment comprised of a thermal hydrolysis unit and anaerobic digesters (CSTRs) was placed at the premises of IIT Roorkee. The purpose is to test and document thermal hydrolysis efficiency in treating sewage sludge from Indian wastewater treatment plants in terms of pathogen removal, biogas production, volatile solids destruction, improved digestion kinetics and digestate dewaterability. The pilot will treat sludge from typical Indian Sewage treatment plants, including both Sequencing Batch Reactor (SBR) sludge and conventional activated sludge process (CASP) sludge (primary and secondary sludge mixture).

The pilot thermal hydrolysis unit is designed for easy operation in a laboratory setting, with combined manual and automatic operation, designed for daily treatment capacity of 8 kg/day. The thermally hydrolyzed sludge is then treated in small scale CSTR anaerobic digesters. This solution converts the organics to biogas, which can be used for biofuel production or combined heat and power (CHP) and a pathogen free slurry that can be reused as biofertilizer, ensuring recovery of the nutrients from the wastewater treatment process.

2 Changes of the technology compared to the DOA

Scope/design has not changed.

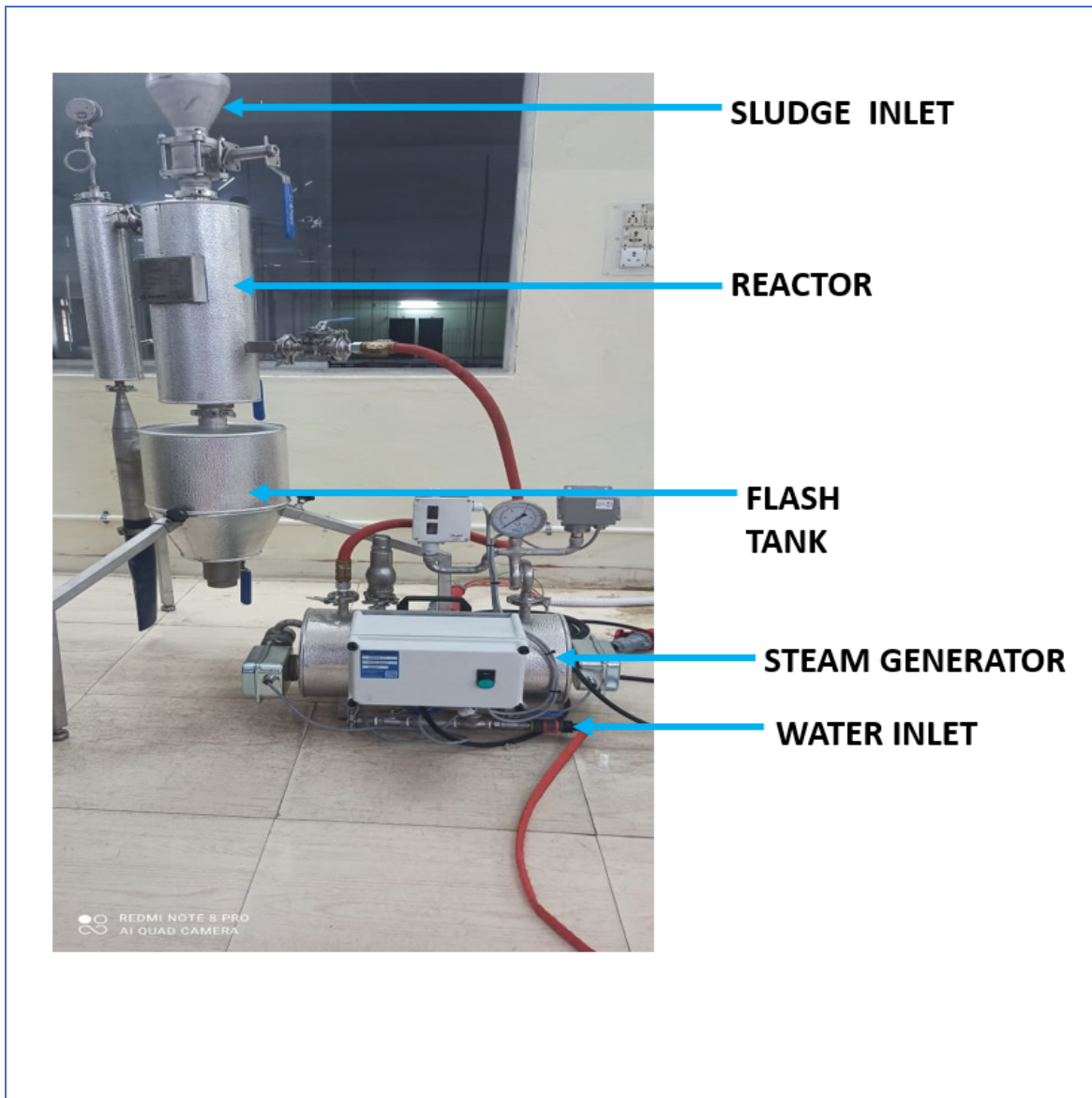
3 Detailed design and project report (task a)

The sludge treated per day will be 8 kg with a Dry Solids concentration of 10% resulting in 0.8 kg DS/day. Sludge is heated in a reactor chamber with steam to reach a maximum temperature of 180 °C for a retention time of 30 minutes. All valves and tanks are designed to withhold the resulting pressure.

The treated sludge (both SBR and ASP sludge) will be analysed before and after thermal hydrolysis to evaluate the effect of the pre-treatment.

4 Detailed engineering design and construction (task b)

The pilot is designed to fit into suitcases and so that it easily can be assembled on site without the use of tools.



Picture – Pilot assembled in IIT Roorkee

5 Commissioning and start of operation (task c)

The pilot was commissioned on 25.08.2021 and operation is expected to be start from October 15, 2021 onwards.

Activities carried out during the commissioning:

- Commissioning instruction was provided by Team CAMBI through video conferencing.
- Dewatered sludge was collected from sequencing batch reactor (SBR) based sewage treatment plant at IIT Roorkee campus.
- The total solids (TS) of dewatered sludge were checked and accordingly, 14% TS sludge was used for commissioning.
- While commissioning the pilot, all the steps were followed as instructed by CAMBI personnel and mentioned in the operation manual.
- All necessary precautions were taken care of as discussed during the remote commissioning.
- After commissioning was completed, basic parameters (TS, VS, tCOD, sCOD) of both raw and pretreated sludge were studied in order to confirm and cross-check the functioning of CAMBI pilot.



Picture – Commissioning of THP pilot. Top left: Commissioning with Cambi personell attending remotely. Top right: Pilot assempled and ready for commissioning. Bottom: Untreated sludge to the left, and treated sludge to the right.