

Climate sensitive Nature based Solutions for Faecal Sludge Management across Maharashtra

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Global South Academic Conclave on WASH and Climate linkages
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CWAS CENTER
FOR WATER
AND SANITATION
CRDF CEPT
UNIVERSITY

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Maharashtra- one of the most urbanized states in India

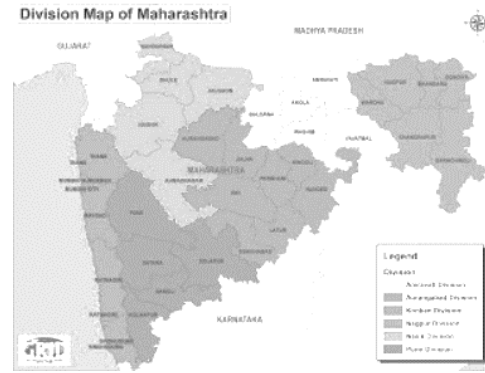


60
million

Population

46%

Urban
Population



06

Administrative
divisions



412

Urban
Local
Bodies

14 cities

Million + population

229

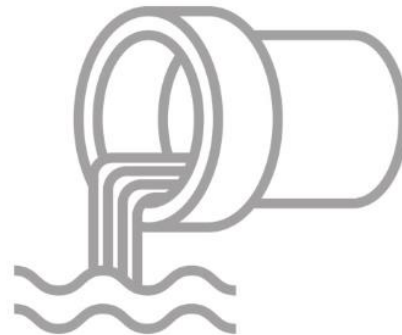
M.CI (25K-300K Pop.)

27

M.Corp.(300k+ pop.)

128

NP (10k+ 25k pop.)



48%

Access to
piped sewer
system



52%

Use
onsite
system

A decade of Strategic support on WASH and Climate to GoM

Supporting Swachh Bharat Mission 1.0 and 2.0

2023

1st



ODF 42 ODF+ 84 ODF++ 264 Water + 21

2022

3rd



ODF 103 ODF+ 85 ODF++ 200 Water + 4

Support to Majhi Vasundhara



- Support for developing guidelines on climate responsive Urban Wash.
- Scaling up and strategizing for city wide Wash climate action plan.
- Capacity building on carbon neutral wash facilities .

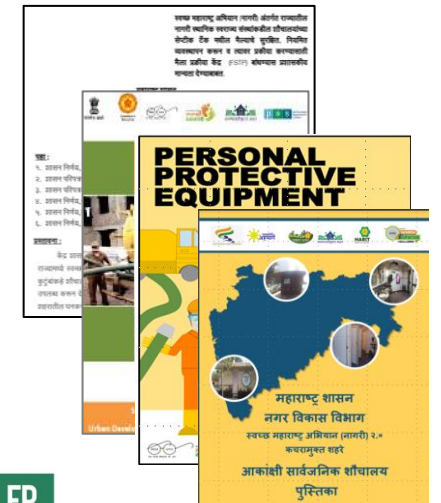
SBM ,Majhi Vasundhara ,NULM Convergence



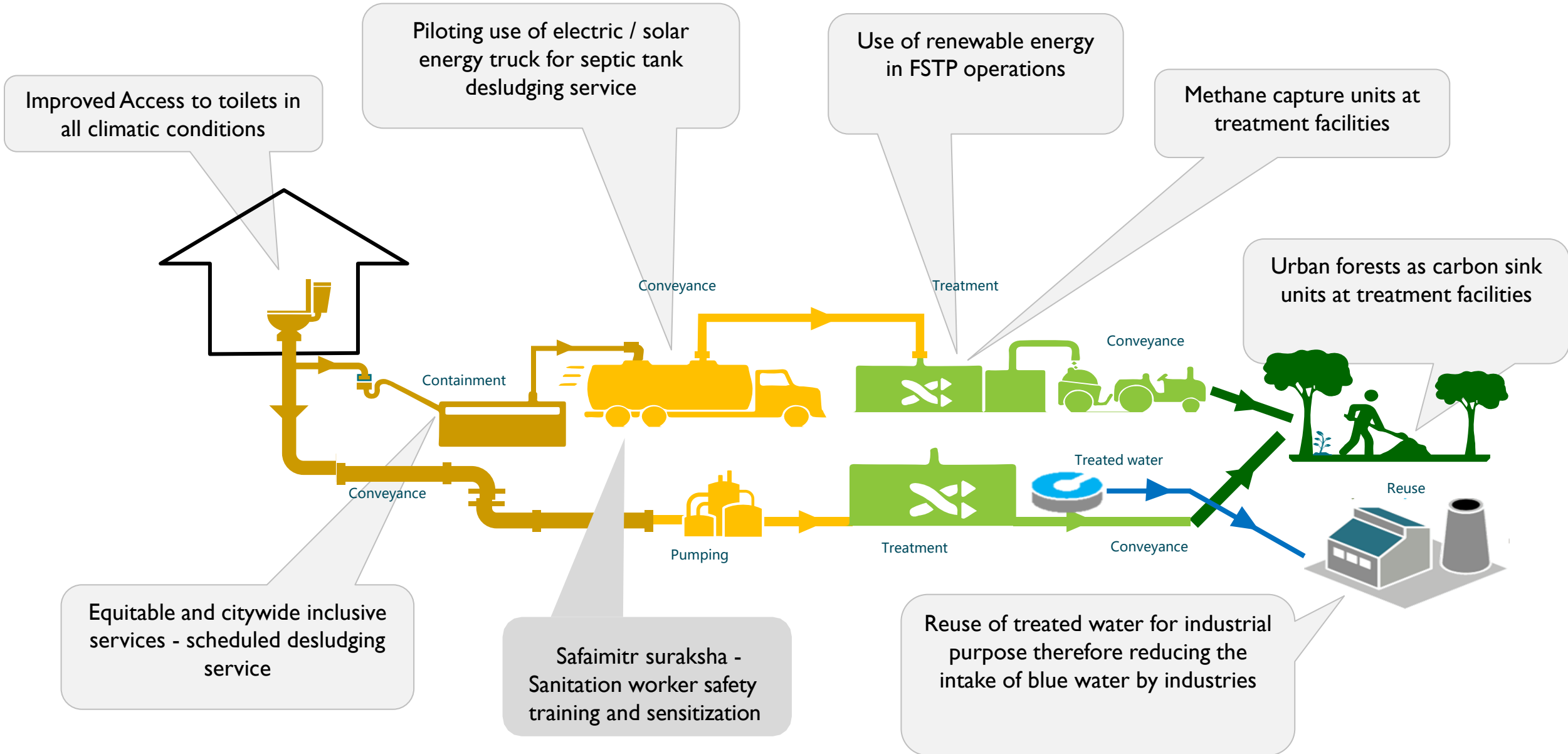
- SBM-NULM convergence in Maharashtra is led under the **guidance of Directorate of Municipal Administration (DMA), Govt. of Maharashtra.**
- Working towards Gender climate nexus

Policy and Strategic support

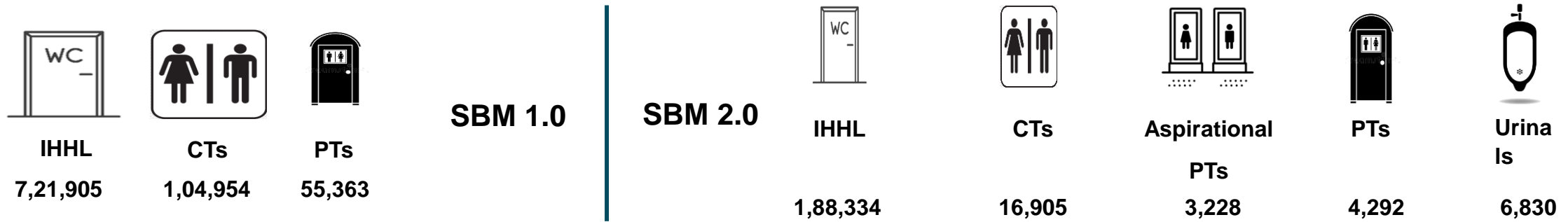
- ODF,ODF+,ODF++,Water+ framework
- State Resolutions
- ODF Handbook
- Septage guidelines
- Guidebook for FSSM
- FSSM Policy



Emissions and mitigation potential across Sanitation value chain



Maharashtra's focus towards Universal access to Toilets in context of Climate change and its impacts . . .



- **All households should have IHHL** including new migrated HHs, HHs with previous access to community toilets (CT), HHs with insanitary latrines
- **Tenure security issues** are to be **de-linked from benefits**.
- IHHL to be built in tandem with **municipal water supply connection**
- Every public place has at least one PT/ Urinal available within 500 metre distance, and that the facilities are kept clean, functional and open for public use.
- Sanitation credit can serve as an option for financing constraints

State ownership for adopting independent Treatment systems for FSSM

Co-treatment at own/nearby STPs

**Category A cities:
ULBs with STPs**

Co-treatment at own STP and accept
FS from nearby cities

Functional/proposed/under
construction STPs

35 ULBs

73 ULBs

**Category B cities:
Co-treatment at nearby STPs**

Co-treatment at nearby STPs within
20 km

Co-treat at nearby STPs

38 ULBs

Independent FSTP

**Category C cities:
Independent FSTPs**

Remaining ULBs will treat septage at
FSTPs

Independent FSTP

311 ULBs

311 ULBs

Maharashtra's focus on Climate friendly Nature-based Solutions

4 technology options vetted and approved on 3rd October 2018

- Up-flow anaerobic sludge blanket (UASB)
- Moving bed biofilm reactor (MBBR) + Co-composting

Sludge drying beds

Planted Sludge drying beds

FSTP technologies vetted by NEERI as mainstream FS treatment solution



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NEERI/General/2018/856 3rd October, 2018

To,
Prof. Dinesh Mehta
Professor Emeritus
Center for Water and Sanitation (C-WAS),
CEPT University, Kasturbhai Lalbhai Campus,
University Road, Navrangpura,
Ahmedabad-380 009

Sub: Technical appraisal of DPR's (Faecal Sludge Management technologies)
Ref: Letter from CEPT University dated 07.07.2018

Sir,

NEERI is in receipt of the following reports prepared by CEPT University:

1. Report on FSTP for Akot Municipal Council
2. Report on FSTP for Gevrai Municipal Council
3. Report on FSTP for Chiplun Municipal Council
4. Report on FSTP for Umred Municipal Council

After carrying out technical evaluation of these reports, it was seen that the assumptions considered and calculations in these reports are correct and that these technologies suggested in these reports are justified. Thus, it is felt that these designed processes can achieve the desired treatment levels for Faecal sludge.

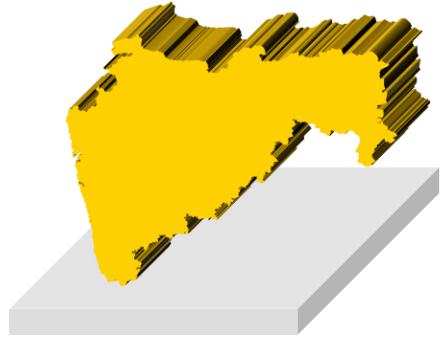
Hence, these technologies maybe approved with the caveats that regular maintenance be done and monitoring and stringent enforcement of the regulations (By Central and State Pollution Control Boards) be carried out as it is essential for long term sustainability of the areas.

Please feel free to revert to us for any clarifications on this matter.

Thanking You.

Yours sincerely,
J. K. Banerjee
(Scientist In-Charge)

Maharashtra decided to set up independent FSTPs in all the remaining 300+ ULBs



Single window approval of FSTPs



2019

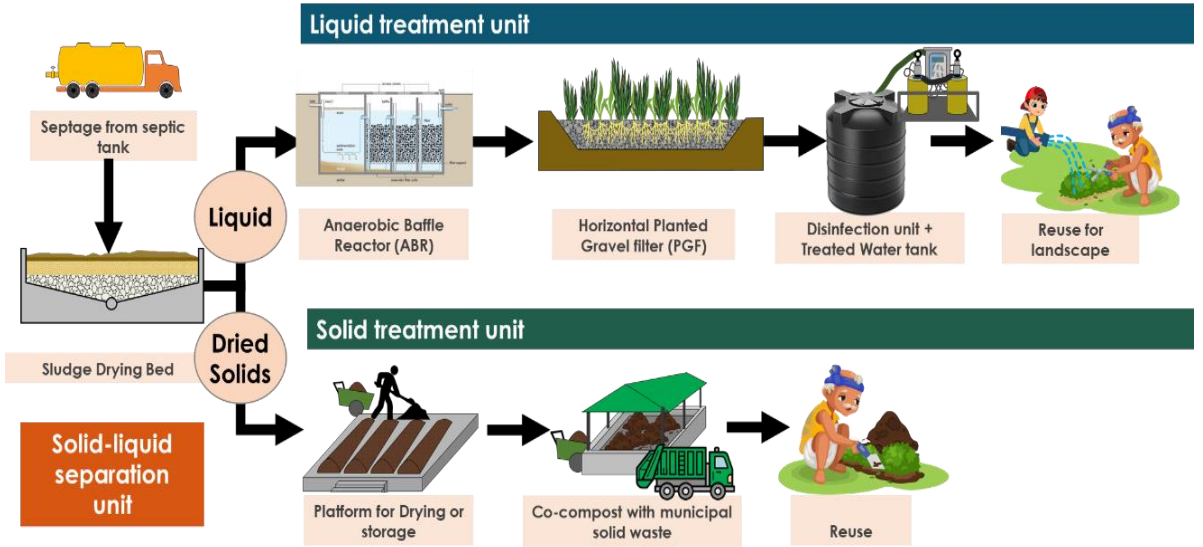
GR Published Sanctioning 311 FSTPs in Maharashtra



Less Mechanized technology

Cost effective

Cost of FSTPs in Maharashtra:
~ 1.40 – 2.8 lakh per KLD



2020

34

FSTP operational across Various Divisions

2021

102

FSTP operational across Various Divisions

2022

145

FSTP operational across Various Divisions

2023

170

FSTP operational across Various Divisions

2024

227

FSTP operational across Various Divisions

Maharashtra has avoided more than 2000 KLD of septage from being indiscriminately disposed into land and water bodies. Hence avoiding environmental degradations . . .

GoM committed to scale up Scheduled desludging which helps improve environmental outcomes and help reduce GHG emissions . . .

- A total of **10,272 septic tanks** are desludged in **2 cities of Maharashtra**. With Wai completing 1st cycle of scheduled desludging.
- Leading to a reduction of 60 % organic load in drains and **improving river water quality**.



- Reduction in Nitrogen, Total Suspended solids and Organic loads in septic tanks effluent after desludging them



- Reduced concentration from septic tank effluent helped in reducing the discharge of nitrogen and TSS into the open drains
- 50-60% decrease in the value of TSS in desludged areas
- 50-60% decrease in BOD load in drains in desludged areas



479 Desludging vehicles are in the procurement stage from the State level in mission mode

Mandate: As per **GoM circular dated 30th November 2022** on Scheduled Desludging of Faecal sludge from septic tank and carrying out O&M and repair of FSTP. ULBs have to empty out the septic tank in the city **once in 3 years**.

SD made a part of the **Swachh Survekshan** Guidelines by MoHUA

IEC messages around scheduled cleaning (once in every 3 years) of septic tanks

Whether >50% Septic tanks are geo-tagged for scheduled cleaning?
(Prorata marks down to 50% of objective)

Leveraging ICT Tools to monitor Safe discharge of Faecal sludge

Use of monitoring systems across sanitation service chain for ensuring safe and efficient operations



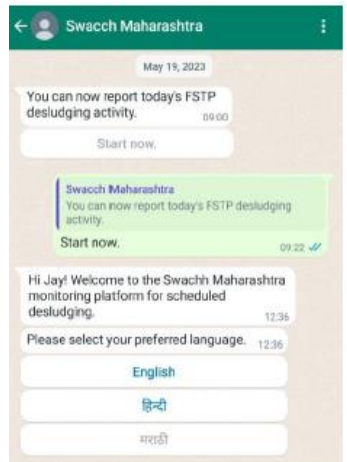
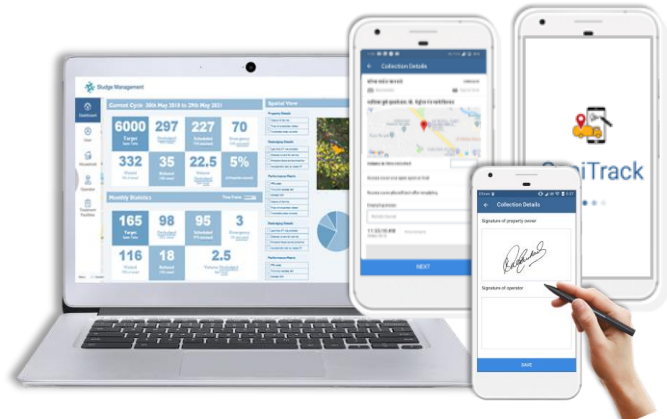
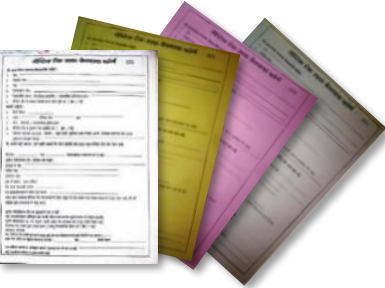
- ### Use of ICT Tools
- Data Analytics for Optimization
 - Route Optimization for Collection Vehicles
 - Real-time Monitoring
 - Community Engagement through Digital Platforms
 - Carbon Accounting and Reporting

FROM Paper based – TO digital systems

SaniTab

SaniTrack

SaniBot



WASH systems being setup using renewable sources of energy, which help in reducing carbon emissions . . .

Wai

- Year of installation : 2021
- Renewable energy generation : 46.4 MWH
- Emission reduction : 923 tons CO2 eq. (over 25 years)

Satara

- Year of installation : 2023
- Installation capacity : 30 KW
- Renewable energy generation : 18.5 MWH
- Emission reduction : 923 tons CO2 eq. (over 25 years)

Sinnar

- Year of installation : 2020
- Installation capacity : 15 KW
- Renewable energy generation : 25.7 MWH
- Emission reduction : 461 tons CO2 eq. (over 25 years)

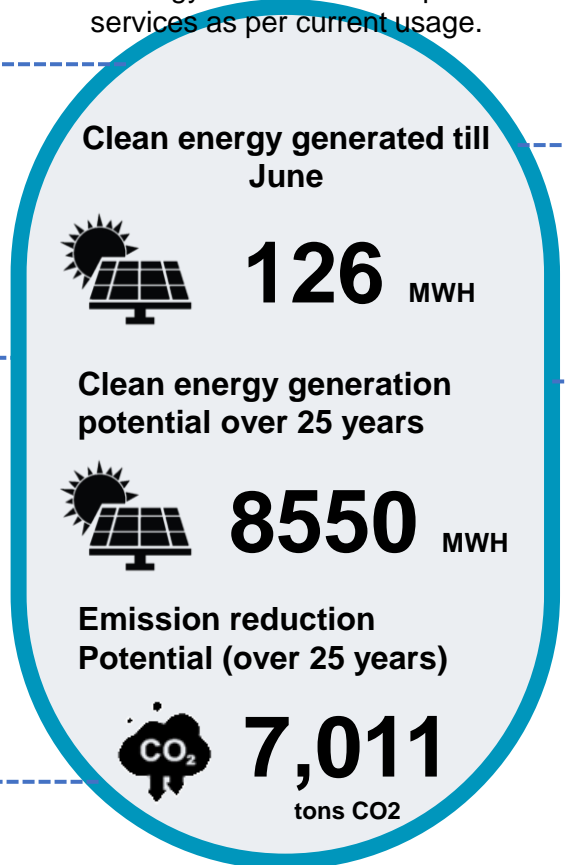
Reducing **16 %**
dependency on conventional energy source of municipal services as per current usage.

Karad

- Year of installation : 2023
- Installation capacity : 72 KW
- Renewable energy generation : 26 MWH
- Emission reduction : 2,214 tons CO2 eq. (over 25 year)

Ichalkaranji

- Year of installation : 2023
- Installation capacity : 81 KW
- Renewable energy generation : 10 MWH
- Emission reduction : 2419 tons CO2 eq. (over 25 years)



Projected Overall cost saving (25 yrs.)

₹ **5.9** Cr.

Can explore the potential of carbon credits based on the energy transition

Developing urban forest using the wastewater treated using the renewable energy at STP and FSTPs

Closing the loop through Resource Recovery and saving freshwater . . .

Ambajogai, India



- **Treated water:** Gardening and Landscaping at FSTP site and Urban forest
- **Treated dry solids :** Exploring use of dried sludge as a soil enricher in plant nursery

Sinnar, India



- **Treated water:** Gardening and greening of the FSTP site; Treated water is being used for adjoining urban forest.
- **Biogas:** Exploring uses in the pantry of the resource centre
- **Treated dry solids:** Used for landscaping

- Approx 480 ML of fresh water can be saved as a result of reusing treated wastewater from the FSTP in a year!!!

Intensifying our approach towards climate friendly practices

Evaluating the carbon sequestration potential of Urban forest and GHG mitigation potential across the FSM value chain in Maharashtra

This WASH – Climate linkage experience of cities is being scaled up across cities of Maharashtra through Majhi Vasundhara Abhiyan

No of Indigenous Trees planted



Sewage Treatment and Reuse of Treated Water



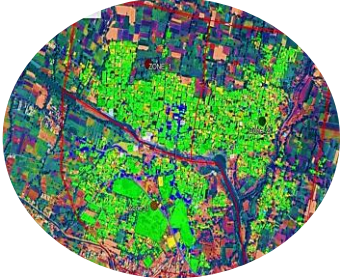
Solar Installation on Public and Private Buildings



Creation of Nursery



Scaling Up Practice and Contributing The National Goals



Scheduled Desludging,

an important parameter in Swachh Survekshan 2023,

MoHUA has made SD a part of the guidelines to be scaled up across the country



FSTP setup

Maharashtra govt initiative for tackling climate change.

Solar FSTPs are being explored



Majhi Vasundhara 400+ ULBs + 24,000+ villages

CWAS has recently signed an MoU with Environment and Climate Change Department of GoM



NULM Convergence

SHG involvement for the sensitized FSSM related activities.

Focus on Gender and Climate nexus



Instructional Scaffolding

Strategy support for policy and guidelines making

- State Resolutions
- ODF Handbook
- FSSM Policy

A Step Towards Achieving Targets Of Sustainable Development Goals



Thank You

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